637455

REPORT NUMBER 301L-GTL-04-003

SAFETY COMPLIANCE TESTING FOR FMVSS NO. 301L FUEL SYSTEM INTEGRITY

FORD MOTOR CO.
2004 FORD ECONOLINE, MPV
NHTSA NO. C40208

GENERAL TESTING LABORATORIES, INC.
1623 LEEDSTOWN ROAD
COLONIAL BEACH, VIRGINIA 22443

OCTOBER 4, 2004

FINAL REPORT

PREPARED FOR

U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
SAFETY ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
400 SEVENTH STREET, SW
ROOM 6115 (NVS-220)
WASHINGTON, D.C. 20590

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Approval Date: 10/04/04

FINAL REPORT ACCEPTANCE BY OVSC:

Accepted By: [signature]

Acceptance Date: 10/12/2004

Technical Report Documentation Page

1. Report No. 301L-GTL-04-003	2. Government Accession No. N/A	3. Recipient's Catalog No. N/A
4. Title and Subtitle Final Report of FMVSS 301L Compliance Testing of 2004 FORD ECONOLINE, MPV NHTSA No. C40208		5. Report Date October 4, 2004 6. Performing Organ. Code GTL
7. Author(s) Grant Farrand, Project Engineer Debbie Messick, Project Manager		8. Performing Organ. Rep# GTL-DOT-04-301L-003
9. Performing Organization Name and Address General Testing Laboratories, Inc. 1623 Leedstown Road Colonial Beach, Va 22443		10. Work Unit No. (TRAIS) N/A 11. Contract or Grant No. DTNH22-01-C-11025
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Admin. Safety Enforcement Office of Vehicle Safety Compliance (NVS-220) 400 7th Street, S.W., Room 6115 Washington, DC 20590		13. Type of Report and Period Covered Final Test Report September 21, 2004 14. Sponsoring Agency Code NVS-220

15. Supplementary Notes

16. Abstract

Compliance tests were conducted on the subject, 2004 Ford Econoline MPV in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-301-02 for the determination of FMVSS 301 compliance.

Test failures identified were as follows:

NONE

17. Key Words	18. Distribution Statement
Compliance Testing Safety Engineering FMVSS 301	Copies of this report are available from NHTSA Technical Information Services (TIS) PL-403 (NPO-405) 400 Seventh Street S.W. Washington, DC 20590 Telephone No. (202) 366-2588

19. Security Classif. (of this report)	21. No. of Pages	22. Price
UNCLASSIFIED	67	

20. Security Classif. (of this page)
UNCLASSIFIED

Form DOT F 1700.7 (8-72)

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SECTION 1

PURPOSE OF COMPLIANCE TEST

1.0 PURPOSE OF COMPLIANCE TEST

A 2004 Ford Econoline MPV was subjected to Federal Motor Vehicle Safety Standard (FMVSS) No. 301 testing to determine if the vehicle was in compliance with the requirements of the standard. The purpose of this standard is to reduce deaths and injuries occurring from fires that result from fuel spillage during and after motor vehicle crashes, and resulting from ingestion of fuels during siphoning.

1.1 The test vehicle was a 2004 Ford Econoline MPV. Nomenclature applicable to the test vehicle are:

A. Vehicle Identification Number: 1FMRE11W94HA29971

B. NHTSA No.: C40208

C. Manufacturer: FORD MOTOR CO.

D. Manufacture Date: 11/03

1.2 TEST DATE

The test vehicle was subjected to FMVSS No. 301 testing on September 21, 2004.

SECTION 2

COMPLIANCE TEST RESULTS SUMMARY

2.0 TEST RESULTS

All tests were conducted in accordance with NHTSA, Office of Vehicle Safety Compliance (OVSC) Laboratory Procedure, TP-301-02 dated 8 November 1994 and General Testing Laboratories, Inc. (GTL) Test Procedure, TP-301-02, "Fuel System Integrity".

Based on the test performed, the 2004 Ford Econoline MPV appears to meet the lateral impact requirements of FMVSS 301 testing.

SECTION 3

COMPLIANCE TEST DATA

3.0 TEST RESULTS

The following data sheets document the results of testing on the 2004 Ford Econoline.

SUMMARY OF RESULTS

Vehicle's NHTSA No.: C40208 Test Model: ECONOLINE

Test Date.: 09/21/04 Time: 11:05 Temperature 67 ° F

Vehicle Model Year, Make, Model and Body Style:
2004 FORD ECONOLINE MPV

Vehicle Test Weight: 5773 lbs.; Impact Velocity: 19.6 mph

Type of Front Occupant Restraint System Installed in Test Vehicle:

Driver's DSP: TYPE 2 BELT WITH FRONTAL AIR BAG IN STEERING WHEEL

Right Passenger's DSP: TYPE 2 BELT WITH FRONTAL AIR BAG IN DASH

Stoddard solvent spillage from Vehicle's Fuel System: None

REMARKS:

RECORDED BY: [signature] DATE: 09/21/04

APPROVED BY: D. Mesick

DATA SHEET 1
TEST VEHICLE SPECIFICATIONS

TEST VEHICLE INFORMATION:

NHTSA No.: C40208
Year/Make/Model/Body Style: 2004 FORD ECONOLINE
Engine Data: 4.6 LITER V6
Transmission Data: 4 SPEED AUTOMATIC
Final Drive Data: REAR WHEEL DRIVE
Major Options: EIGHT PASSENGER SEATING
Date Received: 06/11/04 ; Odometer Reading: 993.7 miles

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured By: FORD MOTOR CO,
Date of Manufacture: 11/03
VIN: 1FMRE11W94HA29971

GVWR: 3175 kg (7000 lbs.);GAWR Front: 1632 kg(3600 lbs.)GAWR Rear: 1723 kg (3800 lbs.)

DATA FROM VEHICLE'S TIRE PLACARD:

Location of Placard on Vehicle: DRIVER'S "B" PILLAR
Tire Pressure With Maximum Capacity Vehicle Load —
Front: 41 psi; Rear: 41 psi
Recommended Tire Size: P235/70R16
Recommended Cold Tire Pressure: Front = 280 kPa(41 psi) Rear = 280 kPa (41 psi)
Size of Tires on Test Vehicle: P235/70R16
Type of Spare Tire: FULL SIZE P235/70R16

Vehicle Capacity Data —

Type of Front Seat(s): BUCKET
Number of Occupants: Front = 2 ; Mid = 3 Rear = 3 ; Total = 8

A. VEHICLE CAPACITY WEIGHT (VCW) =	1841	lbs.
B. Number of Occupants x 150 lbs. =	1200	lbs.
RATED CARGO AND LUGGAGE WEIGHT (RCLW) = A - B =	641	lbs.

RECORDED BY: _____ DATE: 09/20/04

APPROVED BY: _____

DATA SHEET 2
PRE-TEST DATA

WEIGHT OF TEST VEHICLE:

A. As Received At Laboratory (Maximum Fluids) —

Right Front = 634 kg (1398 lbs.) Right Rear = 540 kg (1190 lbs.)

Left Front = 628 kg (1384 lbs.) Left Rear = 538 kg (1187 lbs.)

TOTAL FRONT = 1262 kg (2782 lbs.) TOTAL REAR = 1078 kg (2377 lbs.)

% of TOTAL = 54 % % of TOTAL = 46 %

TOTAL DELIVERED WEIGHT = 2340 kg (5159 lbs.)

B. Calculation of Target Test Weight —

1. Total Delivered Weight = 2340 kg (5159 lbs.)

2. Rated Cargo & Lugg. Weight (RCLW) = 136 kg (300 lbs.)

3. Weight of 2 Dummies (164 lbs. each) = 149 kg (328 lbs.)

TARGET TEST WEIGHT = 1 + 2 + 3 = 2625 kg (5787 lbs.)

C. Vehicle, Dummies and 136 kg (300 lbs.) of Cargo Weight —

Right Front = 684 kg (1508 lbs) Right Rear = 616 kg (1358 lbs)

Left Front = 695 kg (1532 lbs) Left Rear = 624 kg (1375 lbs)

TOTAL FRONT = 1379 kg (3040 lbs) TOTAL REAR = 1240 kg (2733 lbs)

% of TOTAL = 53 % % of TOTAL = 47 %

TOTAL TEST WEIGHT = 2619 kg (5773 lbs)

Weight of Ballast secured in cargo area = 172 kg (380 lbs)
Type of Ballast: SALT BAGS
Method of Securing Ballast: VEHICLE SEAT BELTS
Vehicle Components Removed for Weight Reduction:
NONE

DATA SHEET 2
PRE-TEST DATA CONTINUED

TEST VEHICLE ATTITUDE:

As Delivered —
Right Front: 858 mm (33.8 inches)
Left Front: 869 mm (34.2 inches)
Right Rear: 869 mm (34.2 inches)
Left Rear: 869 mm (34.2 inches)

As Tested —
Right Front: 843 mm (33.2 inches)
Left Front: 856 mm (33.7 inches)
Right Rear: 846 mm (33.3 inches)
Left Rear: 843 mm (33.2 inches)

Vehicle's Wheelbase = 3502 mm (138 inches)

FUEL SYSTEM DATA:

Fuel System Capacity Listed in Owner's Manual = 132 liters (35 gallons)
Usable Capacity Figure Furnished By COTR = 125 liters (33 gallons)

Test Volume Range (91 to 94% of Usable Capacity) —

114 liters (30.0 gallons) TO 117 liters (31.0 gallons)

ACTUAL TEST VOLUME = 116 liters (30.5 gallons) (with entire fuel system filled)

Test Fluid Type: Stoddard solvent
Test Fluid Specific Gravity: .7583
Test Fluid Kinematic Viscosity: 1.7 centistokes at 77° F
Test Fluid Color: BLUE ("red" is preferred)
Type of Vehicle Fuel Pump: ELECTRIC
Electric Fuel Pump Operation with Ignition Switch ON and Engine OFF —
YES, FUEL PUMP WILL RUN FOR TWO SECONDS

Details of Fuel System: HIGH PRESSURE ELECTRIC FUEL PUMP SUPPLY TO FUEL INJECTORS WITH LOW PRESSURE RETURN LINE TO FUEL TANK.

REMARKS:

RECORDED BY: _____ DATE: 09/20/04

APPROVED BY: _____

DATA SHEET 3
POST IMPACT DATA

TYPE OF TEST: 301L
TEST DATE: 09/21/04 ; TIME: 11:05 ; TEMP.: 67 °F
VEH. NHTSA NO.: C40208 ; VIN: 1FMRE11W94HA29971

REQUIRED IMPACT VELOCITY RANGE: 18.9 to 19.9 mph

ACTUAL IMPACT VELOCITY: (speed traps located within 5 feet of impact plane)

Trap No. 1 = 19.6 mph Trap No. 2 = 19.6 mph
Average Impact Speed = 19.6 mph

REMARKS:

RECORDED BY: _____ DATE: 09/21/04

APPROVED BY: _____

DATA SHEET 4
SUMMARY OF FMVSS 301 DATA

TEST VEHICLE NHTSA NO.: C40208 ; TEST DATE: 09/21/04

VEHICLE YEAR/MAKE/MODEL/BODY STYLE:
2004 FORD ECONOLINE

TYPE OF IMPACT: 301L

STODDARD SOLVENT SPILLAGE MEASUREMENT:

A. From impact until vehicle motion ceases —

Actual = 0 oz. Maximum Allowable = 1 ounce

B. For 5 minute period after vehicle motion ceases —

Actual = 0 oz. Maximum Allowable = 5 ounces

C. For next 25 minutes —

Actual = 0 oz. Maximum Allowable = 1 oz./minute

D. Provide Spillage Details: NONE

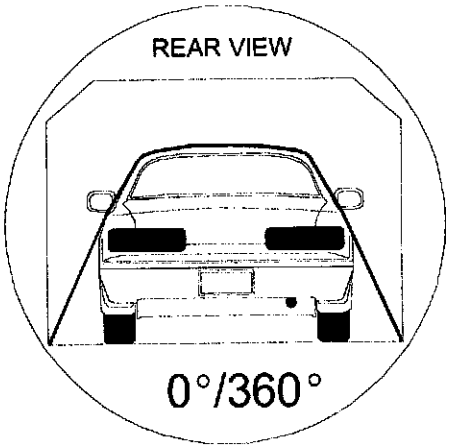
REMARKS:

RECORDED BY: _____ DATE: 09/21/04

APPROVED BY: _____

DATA SHEET 5
STATIC ROLLOVER TEST DATA:

A. Test Phase = 0° to 90°



Determination of Stoddard Solvent Collection Time Period:

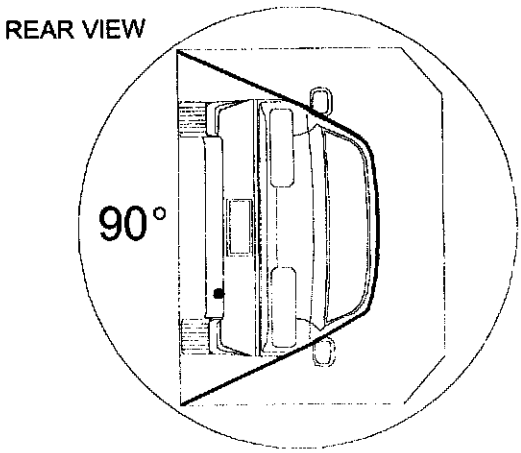
1. Rollover Fixture 90° Rotation Time = 1 minutes, 35 seconds

(Specified Range is 1 to 3 minutes)

2. FMVSS 301 Position Hold Time = 5 minutes, 0 seconds

3. TOTAL = 6 minutes, 35 seconds

4. NEXT WHOLE MINUTE INTERVAL = 7 minutes



Actual Test Vehicle Stoddard Solvent Spillage:

1. First 5 minutes from onset of rotation = 0 oz.
(5 oz. allowed)

2. 6th minute = 0 oz.
(1 oz. allowed)

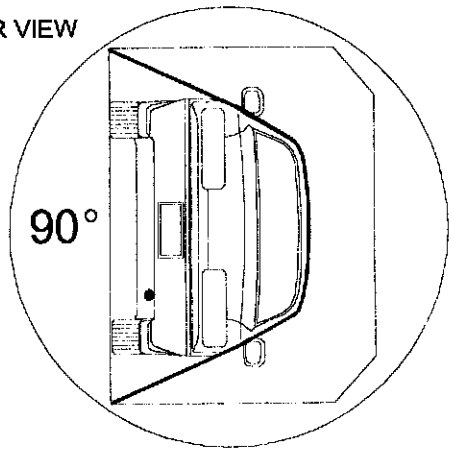
3. 7th minute = 0 oz.
(1 oz. allowed)

4. 8th minute (if required) = N/A oz. (1 oz. allowed)

Provide Details of Stoddard Solvent Spillage Locations — NONE

DATA SHEET 5 CONTINUED

B. Test Phase = 90° to 180°



Determination of Stoddard Solvent Collection Time Period:

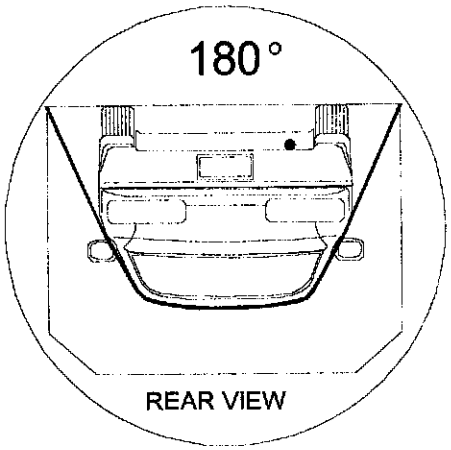
1. Rollover Fixture 90° Rotation Time = 1 minutes, 33 seconds

(Specified Range is 1 to 3 minutes)

2. FMVSS 301 Position Hold Time = 5 minutes, 0 seconds

3. TOTAL = 6 minutes, 33 seconds

4. NEXT WHOLE MINUTE INTERVAL = 7 minutes



Actual Test Vehicle Stoddard Solvent Spillage:

1. First 5 minutes from onset of rotation = 0 oz. (5 oz. allowed)

2. 6th minute = 0 oz. (1 oz. allowed)

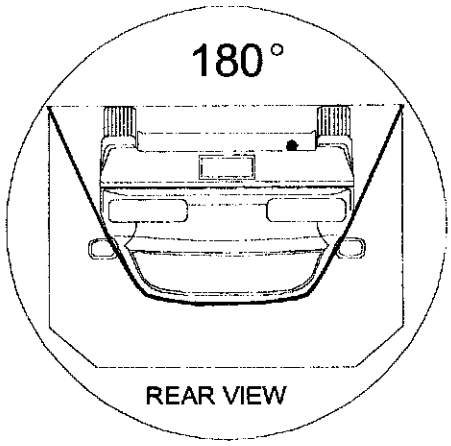
3. 7th minute = 0 oz. (1 oz. allowed)

4. 8th minute (if required) = N/A oz. (1 oz. allowed)

Provide Details of Stoddard Solvent Spillage Locations — NONE

DATA SHEET 5 CONTINUED

C. Test Phase = 180° to 270°



Determination of Stoddard Solvent Collection Time Period:

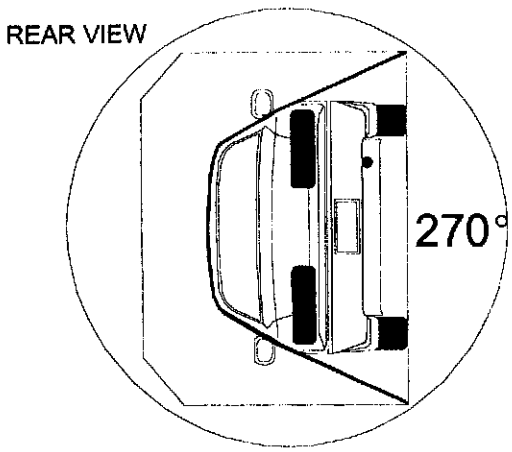
1. Rollover Fixture 90° Rotation Time = 1 minutes, 31 seconds

(Specified Range is 1 to 3 minutes)

2. FMVSS 301 Position Hold Time = 5 minutes, 0 seconds

3. TOTAL = 6 minutes, 31 seconds

4. NEXT WHOLE MINUTE INTERVAL = 7 minutes



Actual Test Vehicle Stoddard Solvent Spillage:

1. First 5 minutes from onset of rotation = 0 oz. (5 oz. allowed)

2. 6th minute = 0 oz. (1 oz. allowed)

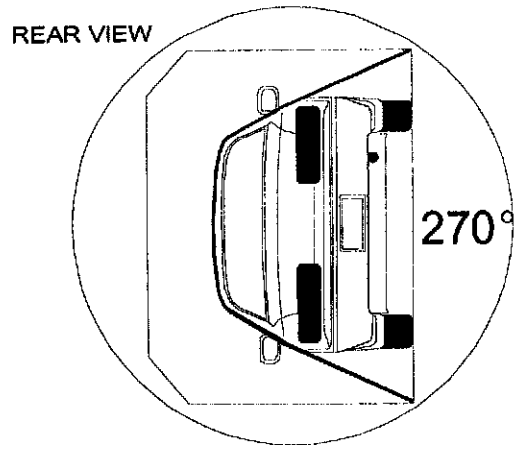
3. 7th minute = 0 oz. (1 oz. allowed)

4. 8th minute (if required) = N/A oz. (1 oz. allowed)

Provide Details of Stoddard Solvent Spillage Locations — NONE

DATA SHEET 5 CONTINUED

D. Test Phase = 270° to 360°



Determination of Stoddard Solvent Collection Time Period:

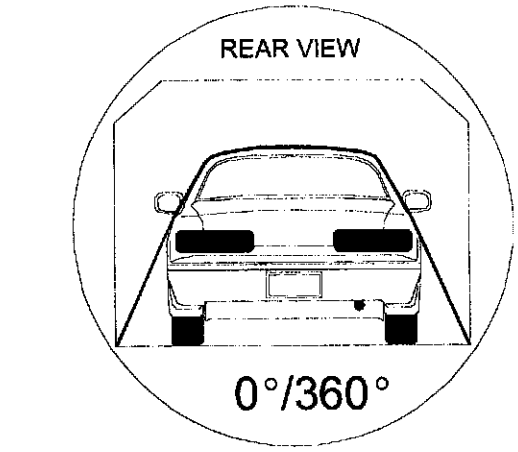
1. Rollover Fixture 90° Rotation Time = 1 minutes, 44 seconds

(Specified Range is 1 to 3 minutes)

2. FMVSS 301 Position Hold Time = 5 minutes, 0 seconds

3. TOTAL = 6 minutes, 44 seconds

4. NEXT WHOLE MINUTE INTERVAL = 7 minutes



Actual Test Vehicle Stoddard Solvent Spillage:

1. First 5 minutes from onset of rotation = 0 oz. (5 oz. allowed)

2. 6th minute = 0 oz. (1 oz. allowed)

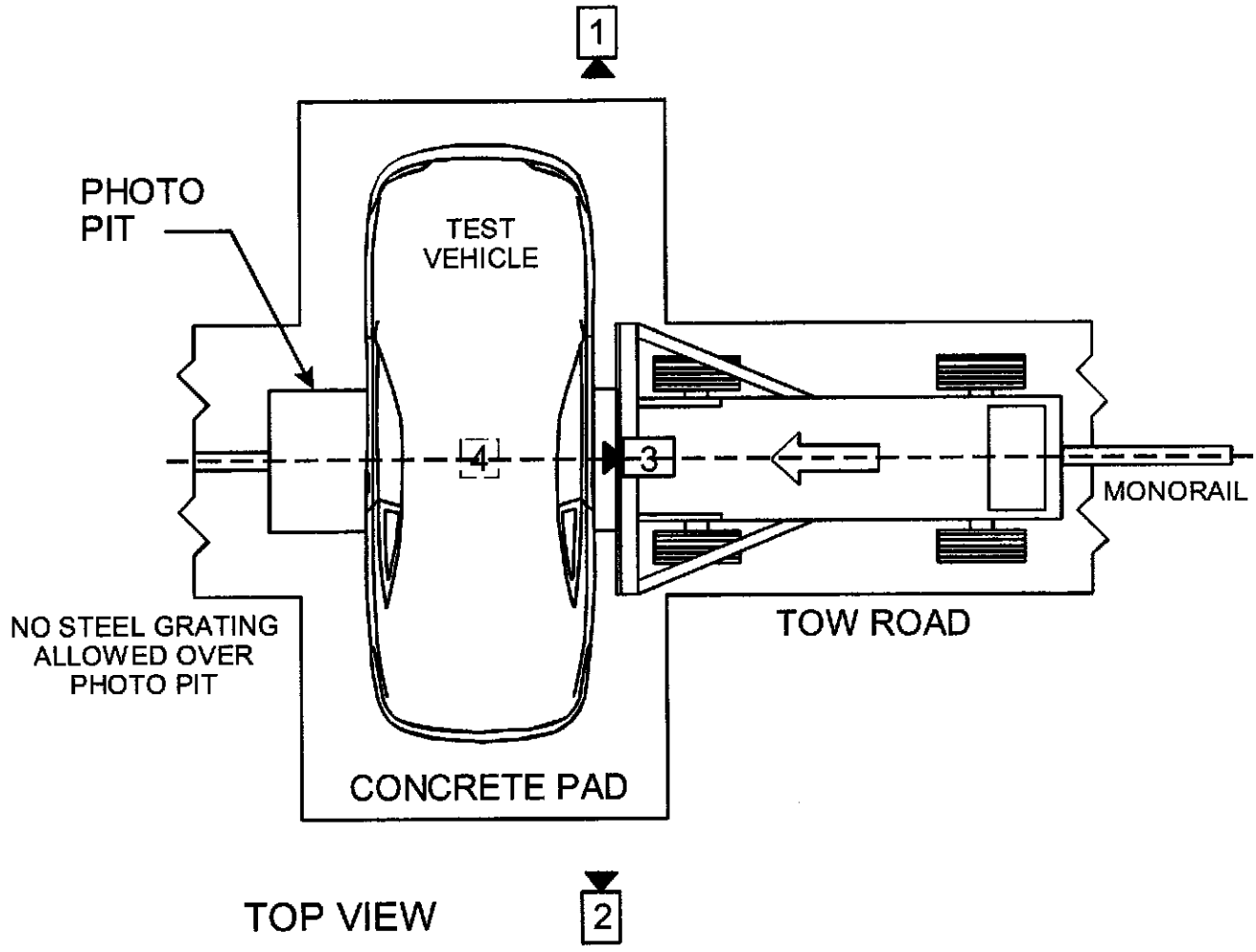
3. 7th minute = 0 oz. (1 oz. allowed)

4. 8th minute (if required) = N/A oz. (1 oz. allowed)

Provide Details of Stoddard Solvent Spillage Locations — NONE

DATA SHEET 6
CAMERA LOCATION

VEHICLE NHTSA NO.: C40208 TEST DATE: 09/21/04



CAMERA 1 – REAR SIDE VIEW OF VEHICLE DURING CRASH
CAMERA 2 – FRONT SIDE VIEW OF VEHICLE DURING CRASH
CAMERA 3 – OVERHEAD VIEW OF ENTIRE IMPACT
CAMERA 4 – UNDERBODY VIEW OF FUEL TANK LOCATED IN PIT

SECTION 4
INSTRUMENTATION AND EQUIPMENT LIST

TABLE 1 - INSTRUMENTATION & EQUIPMENT LIST

EQUIPMENT	DESCRIPTION	MODEL/ SERIAL NO.	CAL. DATE	NEXT CAL. DATE
COUNTER/TIMER	RACAL-DANA	994343	07/04	07/05
COUNTER/TIMER	SYSTRON DONNER	19 353- 116	07/04	07/05
SPEED TRAP 2	GTL ST1	N/A	09/04	09/05
SPEED TRAP 3	GTL ST2	N/A	09/04	09/05
STOP WATCH	ACCUSPLIT	ACT 1 A&B	07/04	07/05
STOP WATCH	ACCUSPLIT	ACT 2 A&B	07/04	07/05
SCALES	INTERCOMP	199744	07/04	07/05
TIRE PRESSURE GAUGE	WEKSLER	0-100	02/04	02/05
STEEL SCALES	STARRETT	C416R	02/04	02/05
STEEL TAPE	STANLEY	GF2	02/04	02/05
LEVEL	STANLEY	42-449	02/04	02/05
TEMP. INDICATOR	OMEGA	B/5562/14/1	03/04	03/05
TEMP. RECORDER	OMEGA	B/5562/14/1	03/04	03/05

SECTION 5

PHOTOGRAPHS

2004 FORD ECONOLINE
NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.1
FRONT VIEW OF VEHICLE PRE-TEST

2004 FORD ECONOLINE
NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.2
LEFT SIDE VIEW OF VEHICLE PRE-TEST

2004 FORD ECONOLINE
NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.3
RIGHT SIDE VIEW OF VEHICLE PRE-TEST

2004 FORD ECONOLINE
NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.4
REAR VIEW OF VEHICLE PRE-TEST

2004 FORD ECONOLINE
NHTSA NO. C40208
FMVSS NO. 301L

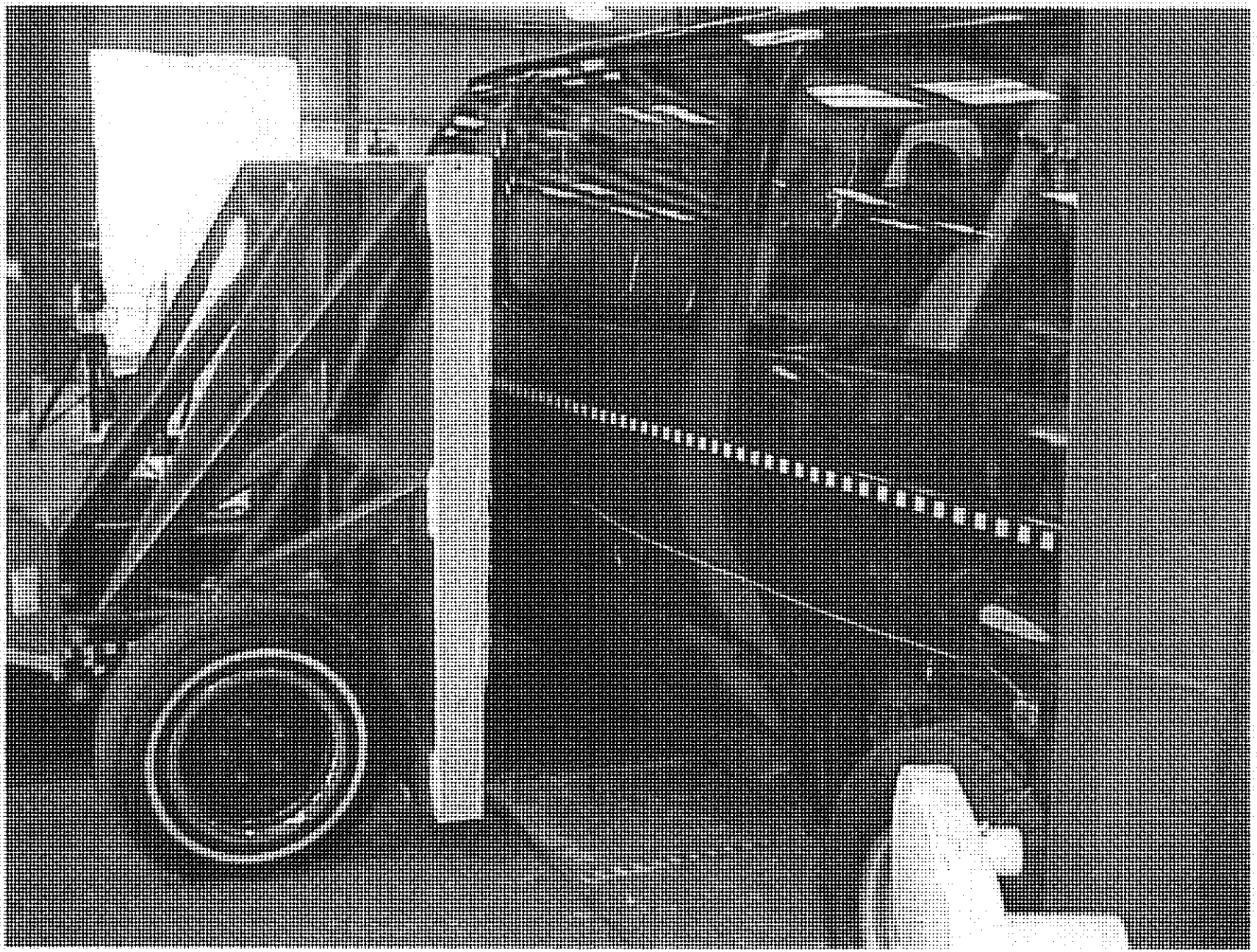
FIGURE 5.5
¾ FRONTAL VIEW FROM LEFT SIDE OF
VEHICLE PRE-TEST

2004 FORD ECONOLINE
NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.6
¾ REAR VIEW FROM RIGHT SIDE OF VEHICLE
PRE-TEST

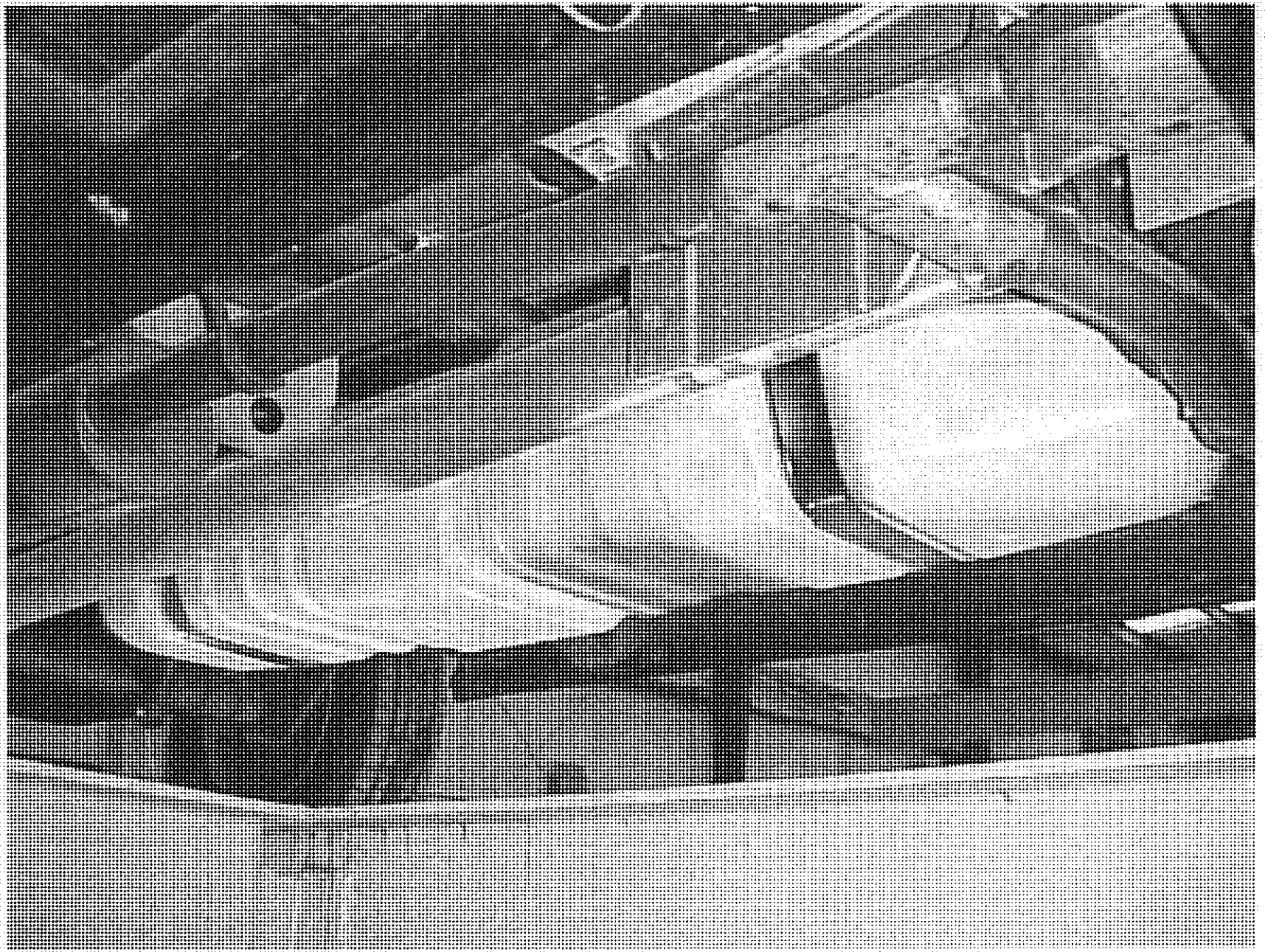
2004 FORD ECONOLINE
NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.7
LEFT VIEW OF VEHICLE/BARRIER PRE-TEST



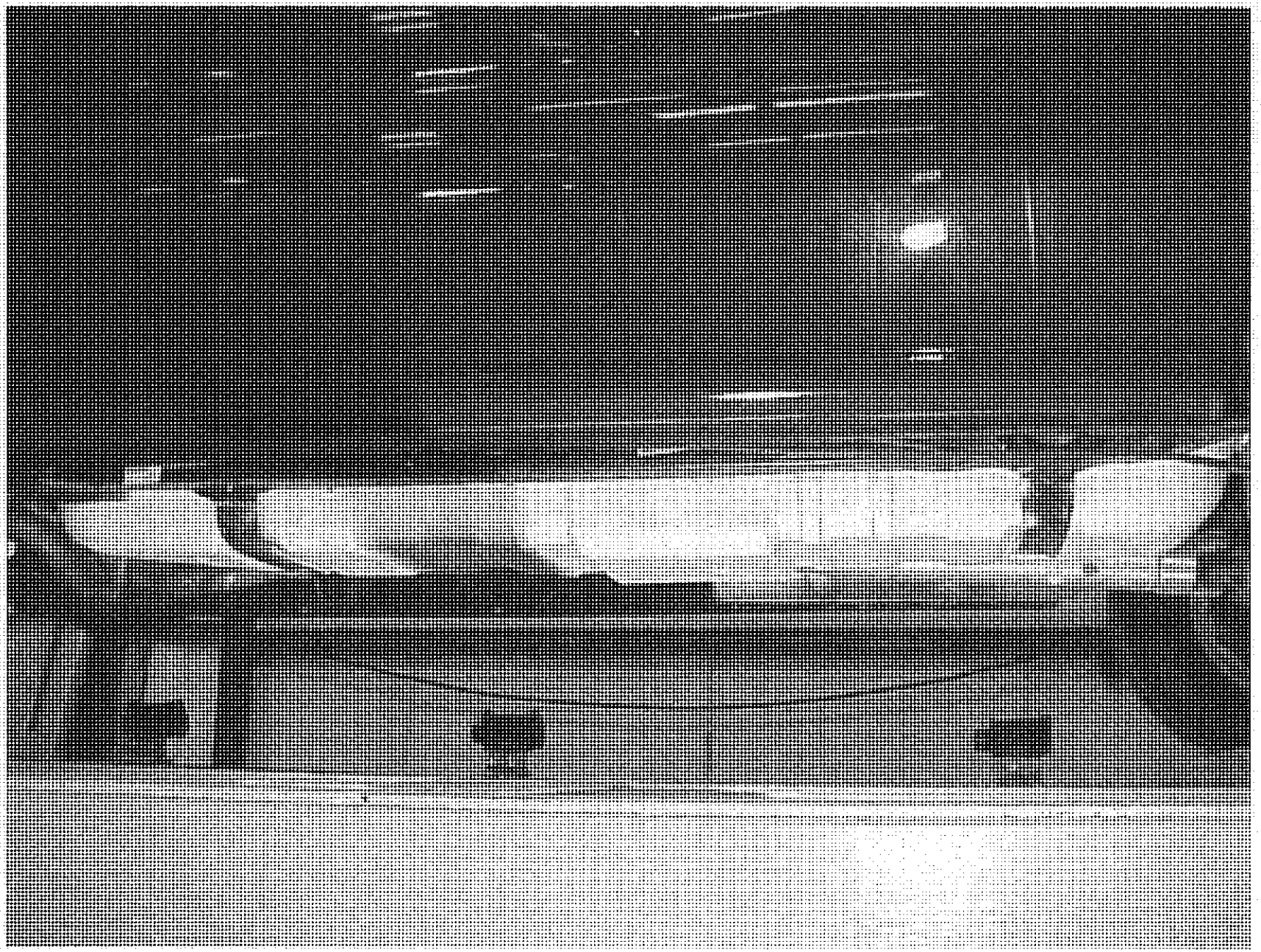
2004 FORD ECONOLINE
NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.8
RIGHT VIEW OF VEHICLE/BARRIER PRE-TEST



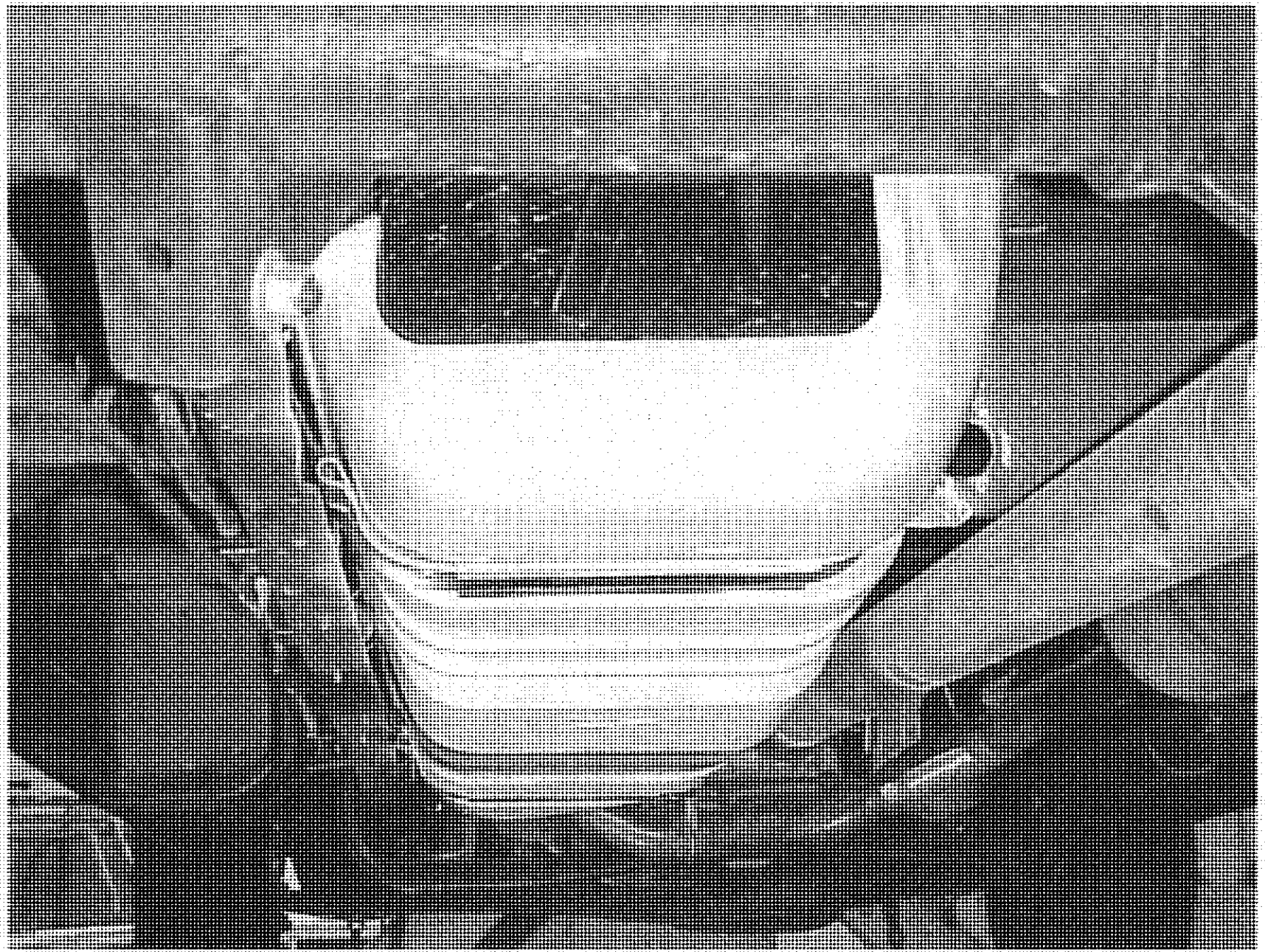
2004 FORD ECONOLINE
NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.9
UNDERBODY VIEW OF FUEL TANK RIGHT VIEW
PRE-TEST



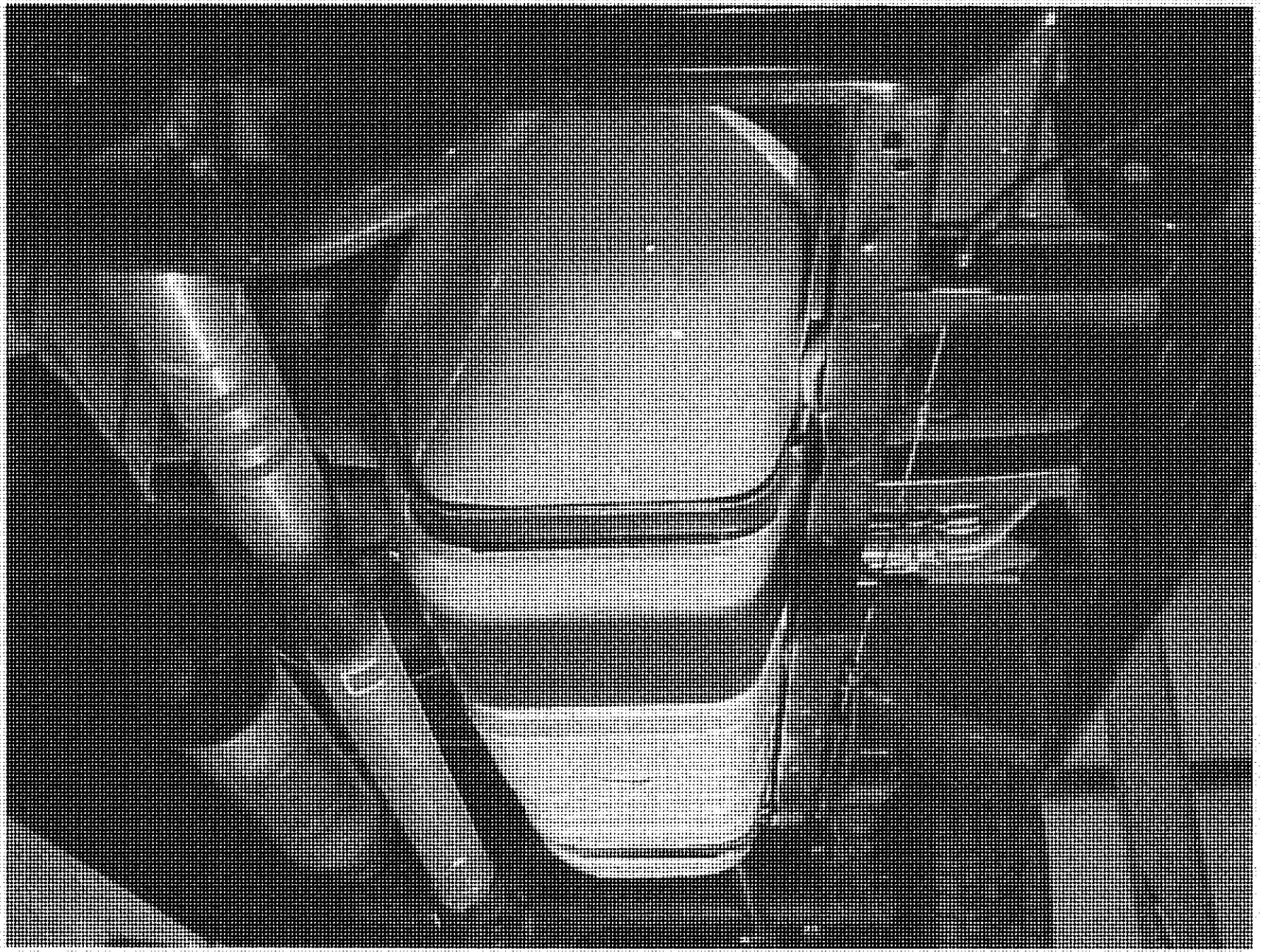
2004 FORD ECONOLINE
NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.10
UNDERBODY VIEW OF FUEL TANK LEFT VIEW
PRE-TEST



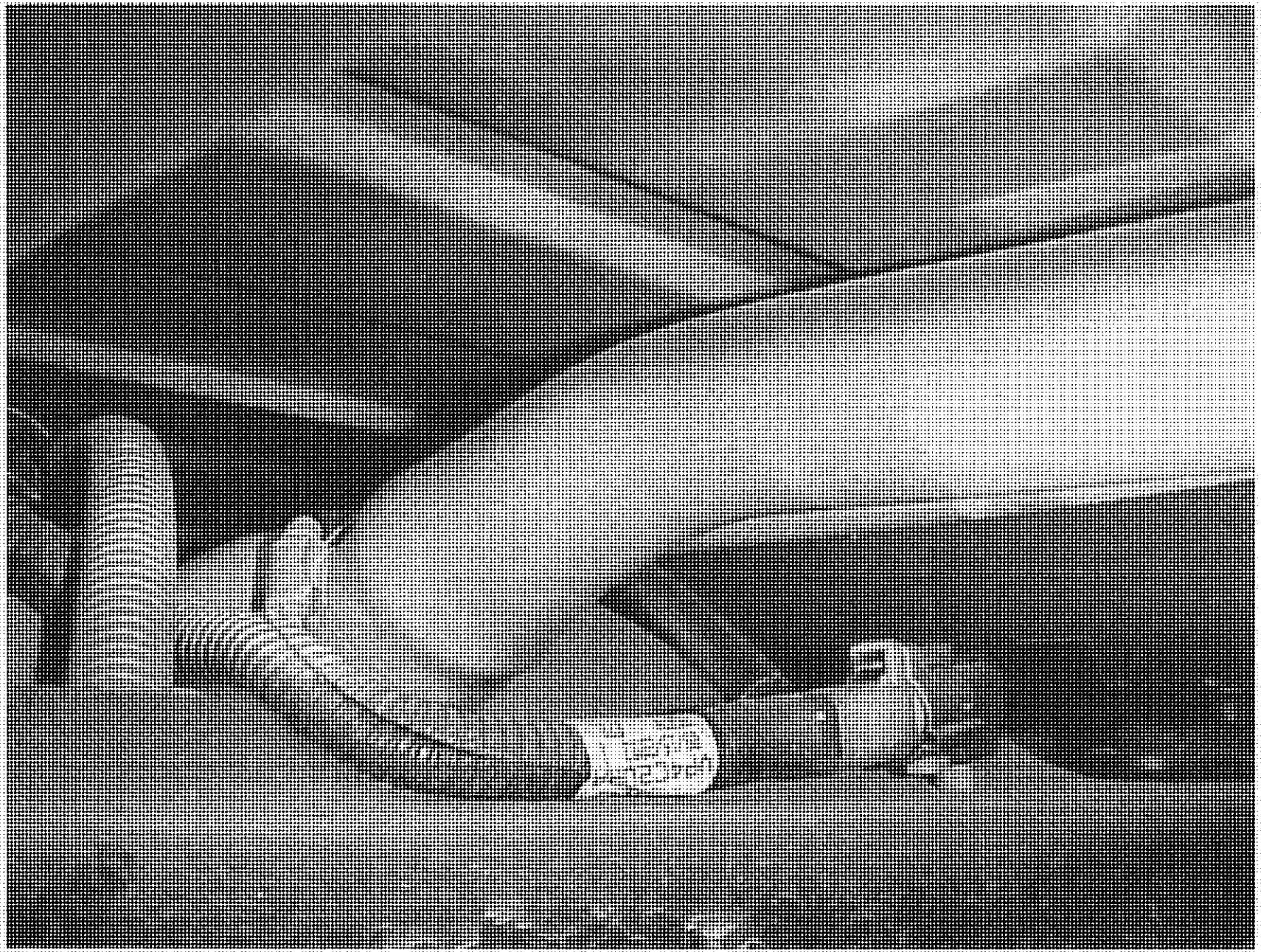
2004 FORD ECONOLINE
NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.11
UNDERBODY VIEW OF FUEL TANK REAR VIEW
PRE-TEST



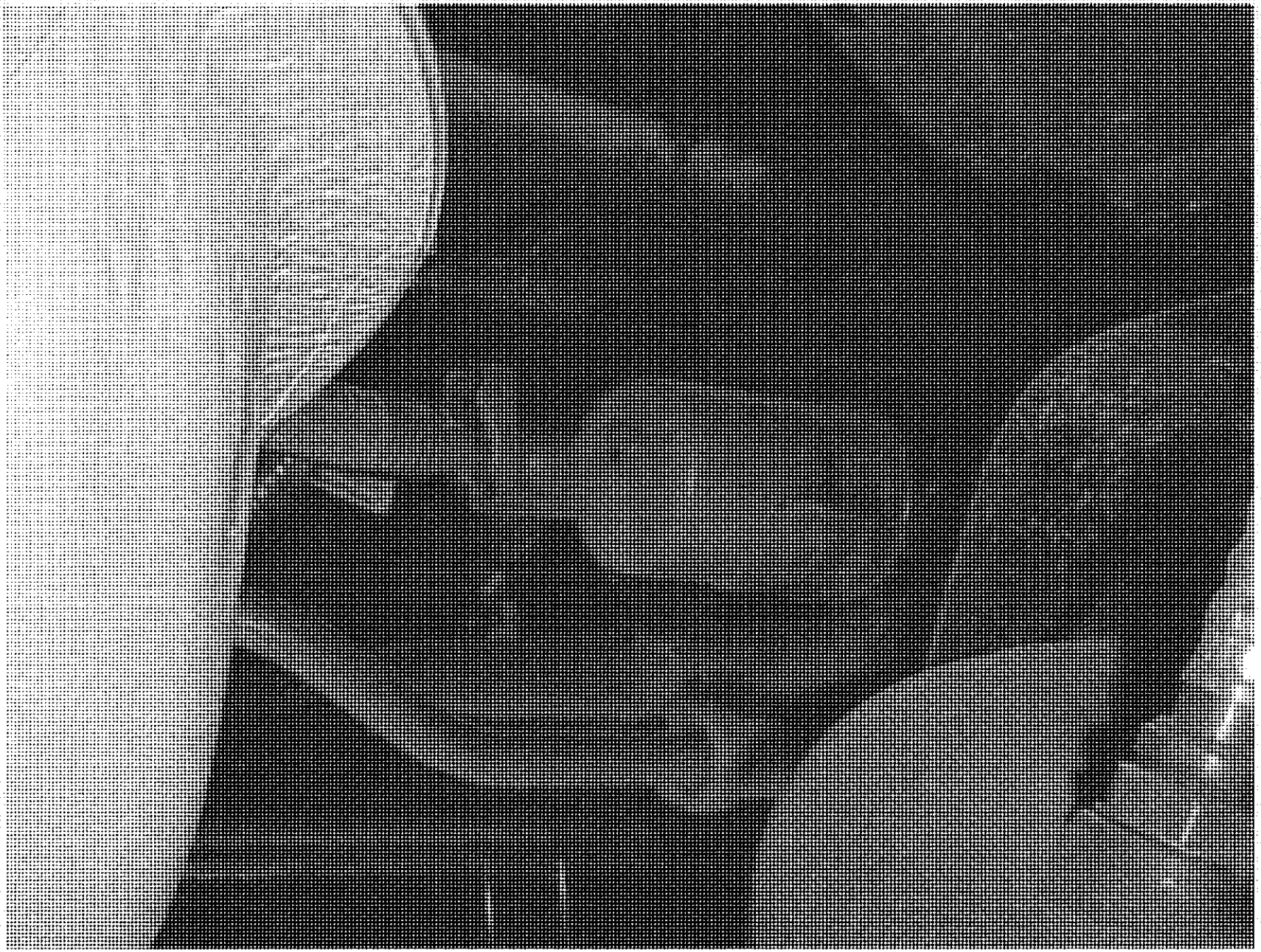
2004 FORD ECONOLINE
NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.12
UNDERBODY VIEW OF FUEL TANK REAR VIEW
PRE-TEST



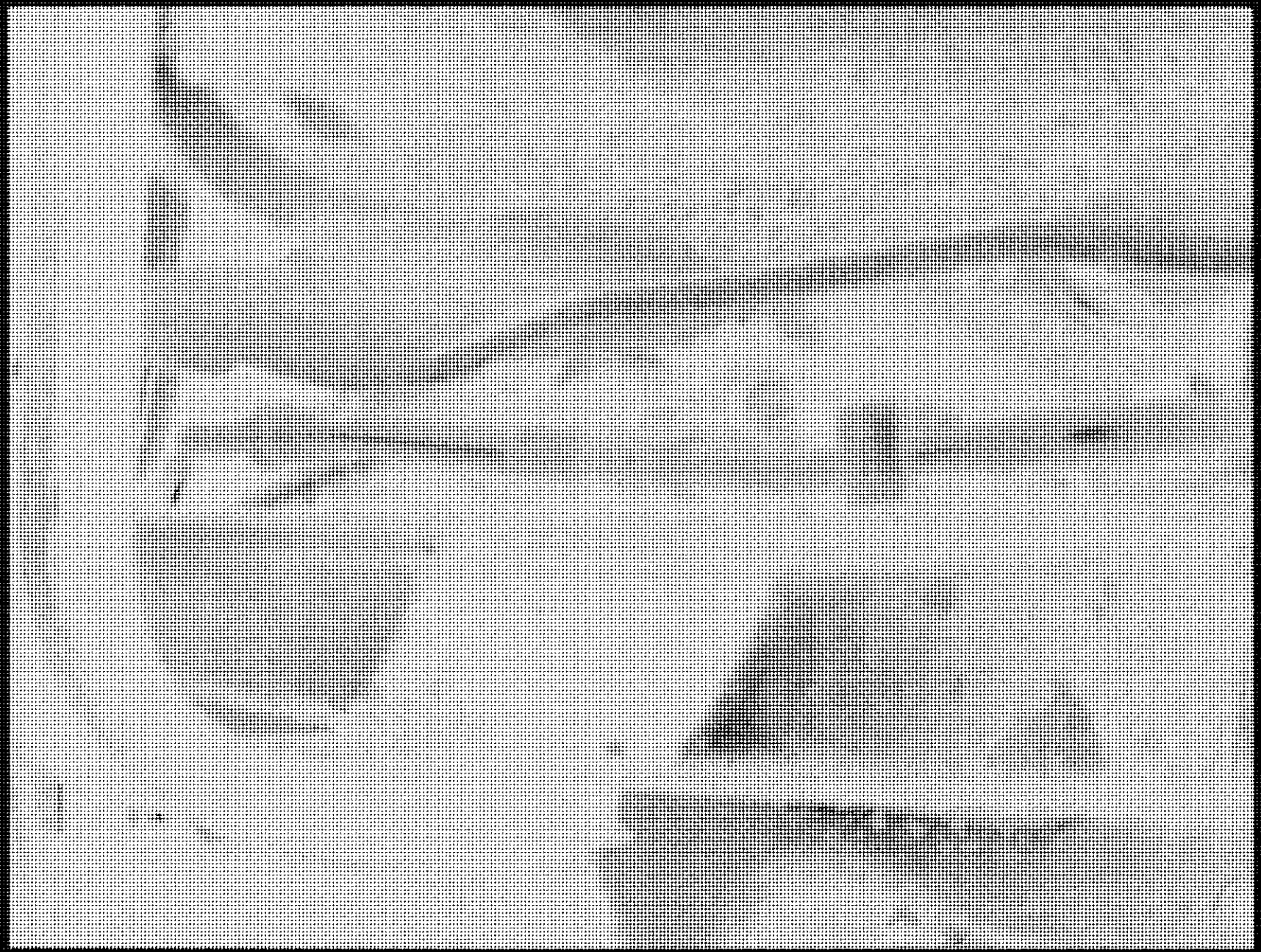
2004 FORD ECONOLINE
NHTSA NO. C40206
FMVSS NO. 301L

FIGURE 5.13
UNDERBODY VIEW OF FUEL FILL HOSE AT TANK PRE-TEST



2004 FORD ECONOLINE
NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.14
UNDERBODY VIEW OF FUEL FILTER AND LINES
AT TANK PRE-TEST



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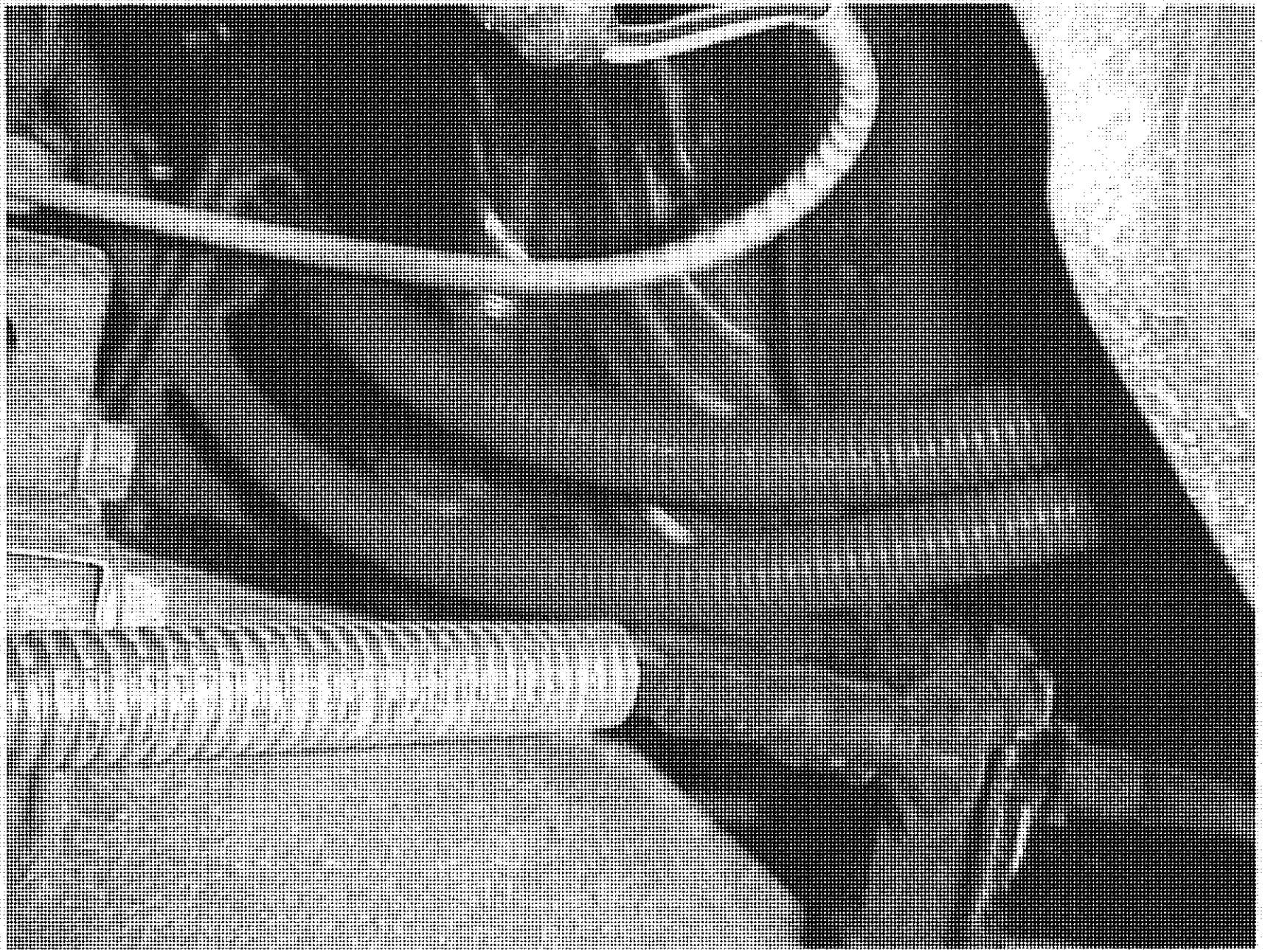
NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.15
UNDERBODY VIEW OF FUEL LINES IN CENTER
PRE-TEST



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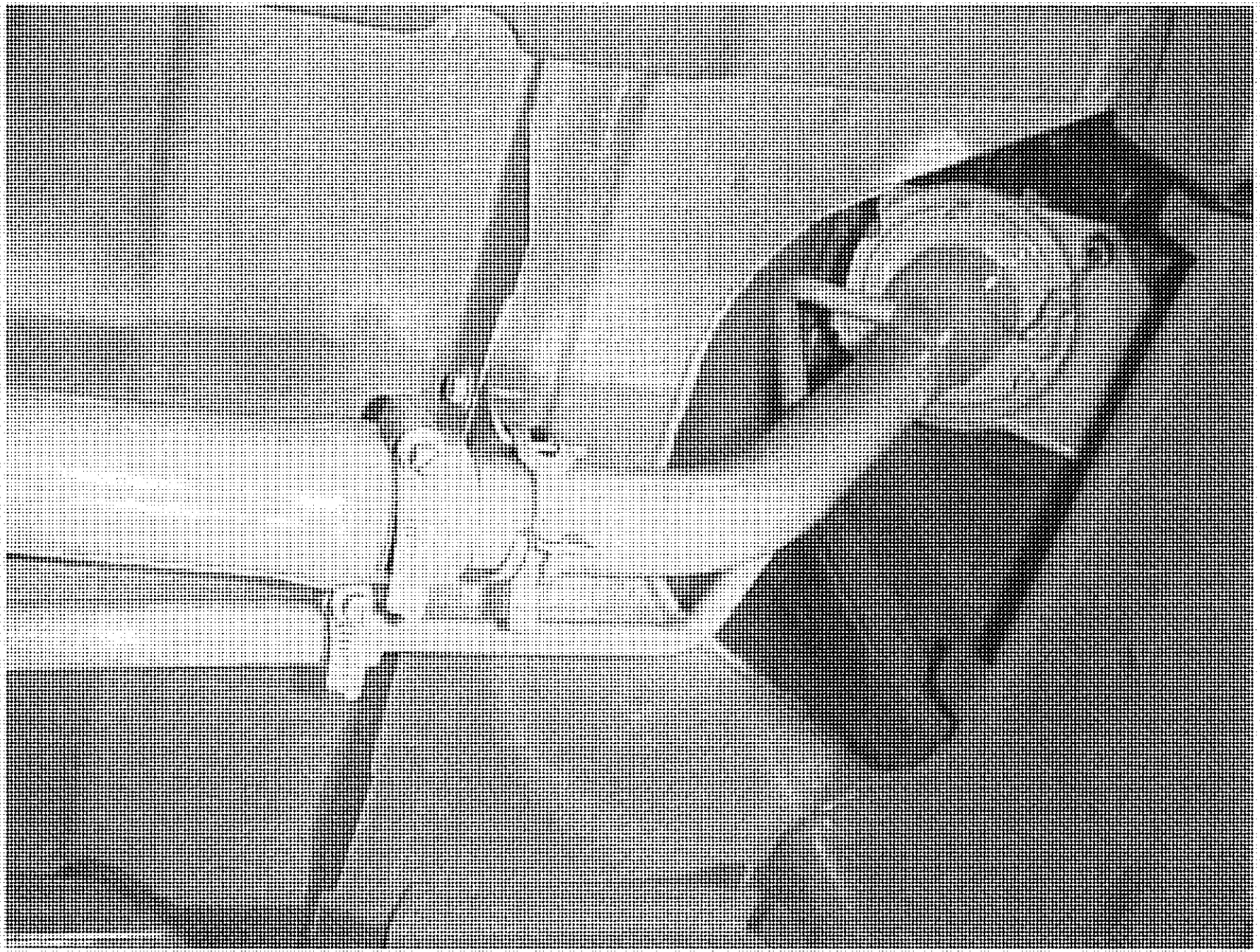
NHTSA NO. C40206
FMVSS NO. 301L

FIGURE 5.16
UNDERBODY VIEW OF FUEL LINES TO ENGINE
PRE-TEST



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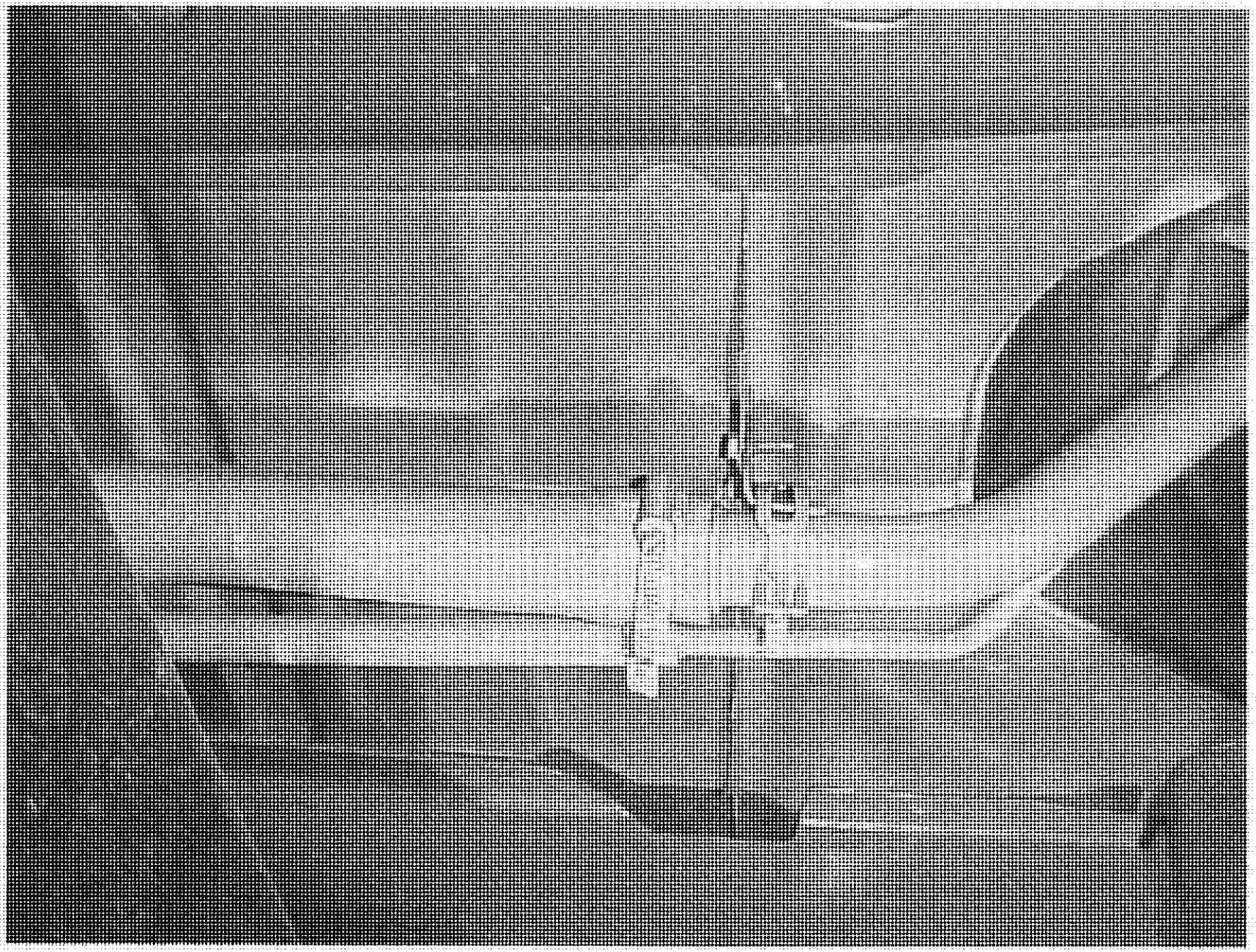
NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.17
UNDERBODY VIEW OF FUEL FILL AND VENT LINES PRE-TEST



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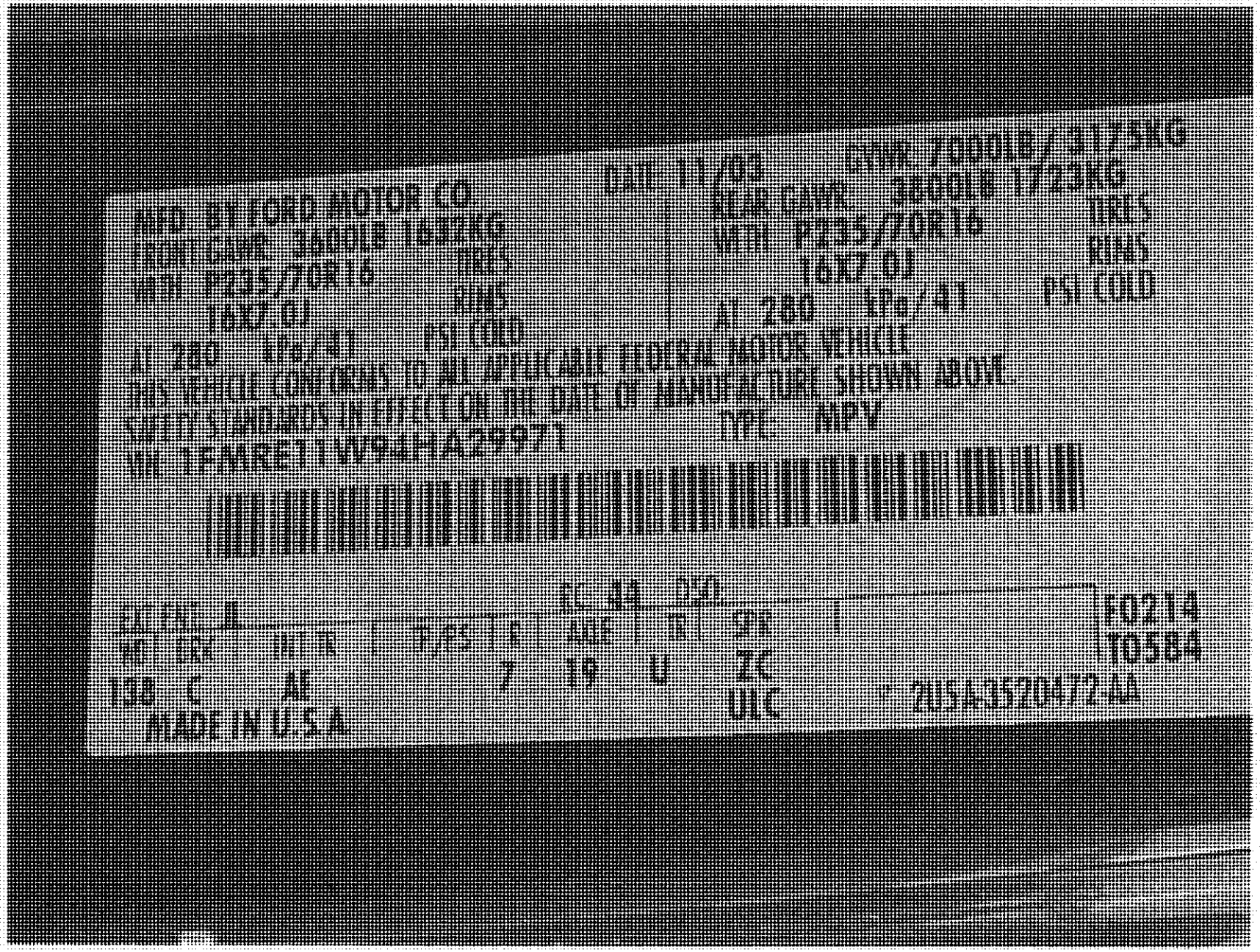
NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.18
UNDERBODY VIEW OF FUEL FILL AND VENT LINES PRE-TEST



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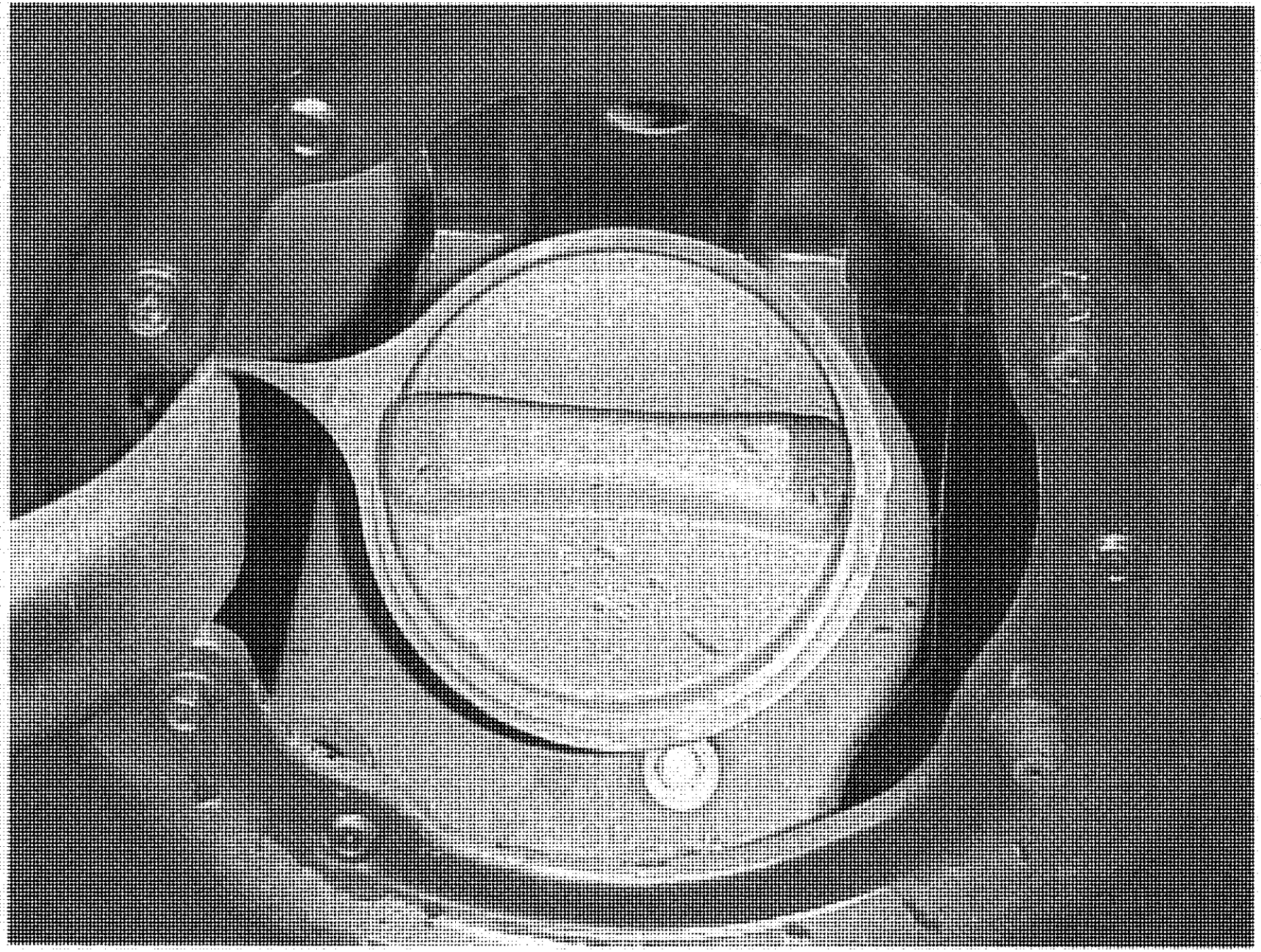
NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.19
VEHICLE CERTIFICATION AND TIRE
INFORMATION LABEL



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NHTSA NO. C40208
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FIGURE 5.20
VEHICLE FUEL CAP PRE-TEST

2004 FORD ECONOLINE
NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.21
FRONT VIEW OF VEHICLE POST TEST

2004 FORD ECONOLINE
NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.22
LEFT SIDE VIEW OF VEHICLE POST TEST

2004 FORD ECONOLINE
NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.23
RIGHT SIDE VIEW OF VEHICLE POST TEST

2004 FORD ECONOLINE
NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.24
REAR VIEW OF VEHICLE POST TEST

2004 FORD ECONOLINE
NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.25
¾ FRONTAL VIEW FROM LEFT SIDE OF
VEHICLE POST TEST

2004 FORD ECONOLINE
NHTSA NO. C40203
FMVSS NO. 301L

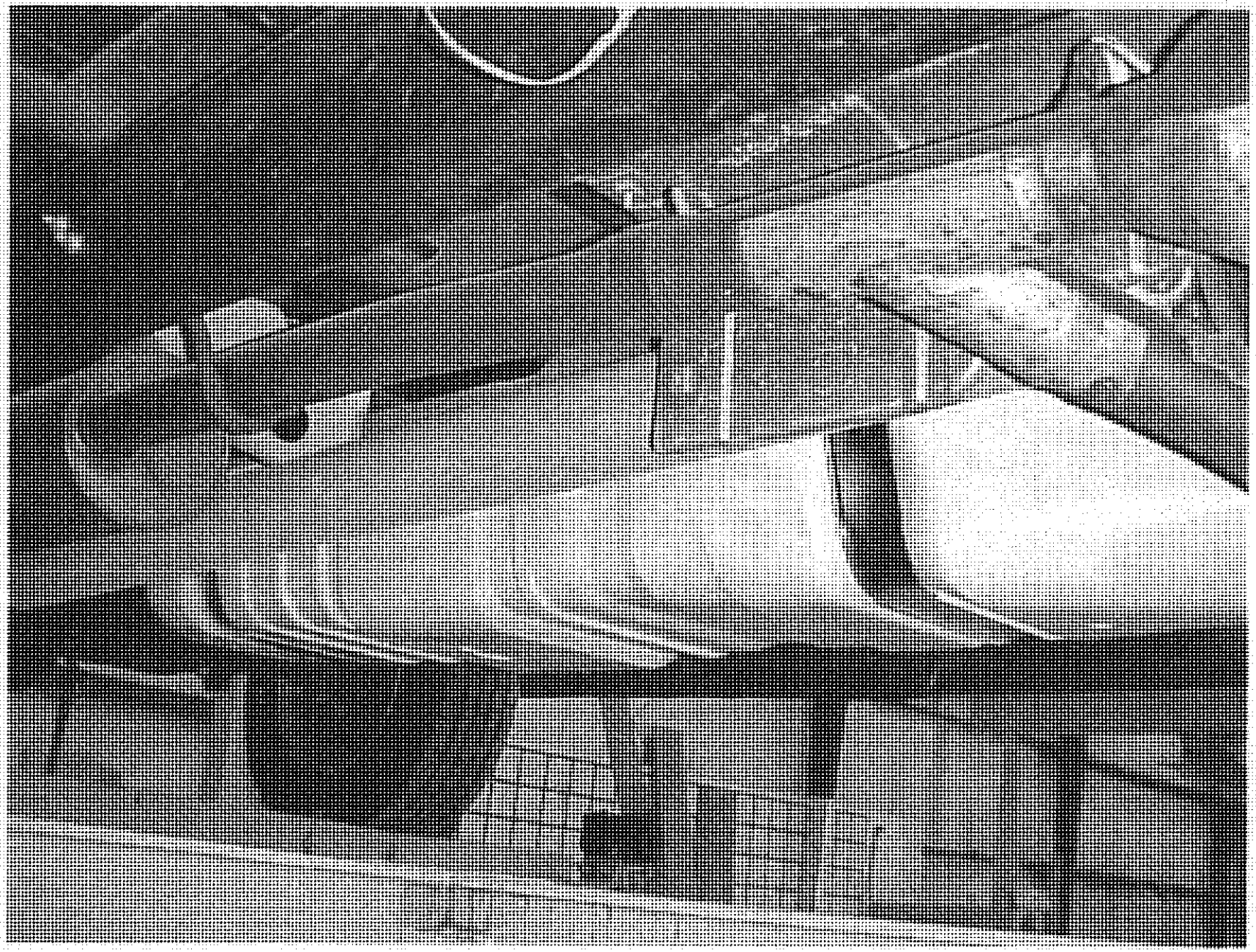
FIGURE 5.26
¾ REAR VIEW FROM RIGHT SIDE OF VEHICLE
POST TEST

2004 FORD ECONOLINE
NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.27
LEFT VIEW OF VEHICLE/BARRIER POST TEST

2004 FORD ECONOLINE
NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.28
RIGHT VIEW OF VEHICLE/BARRIER POST TEST



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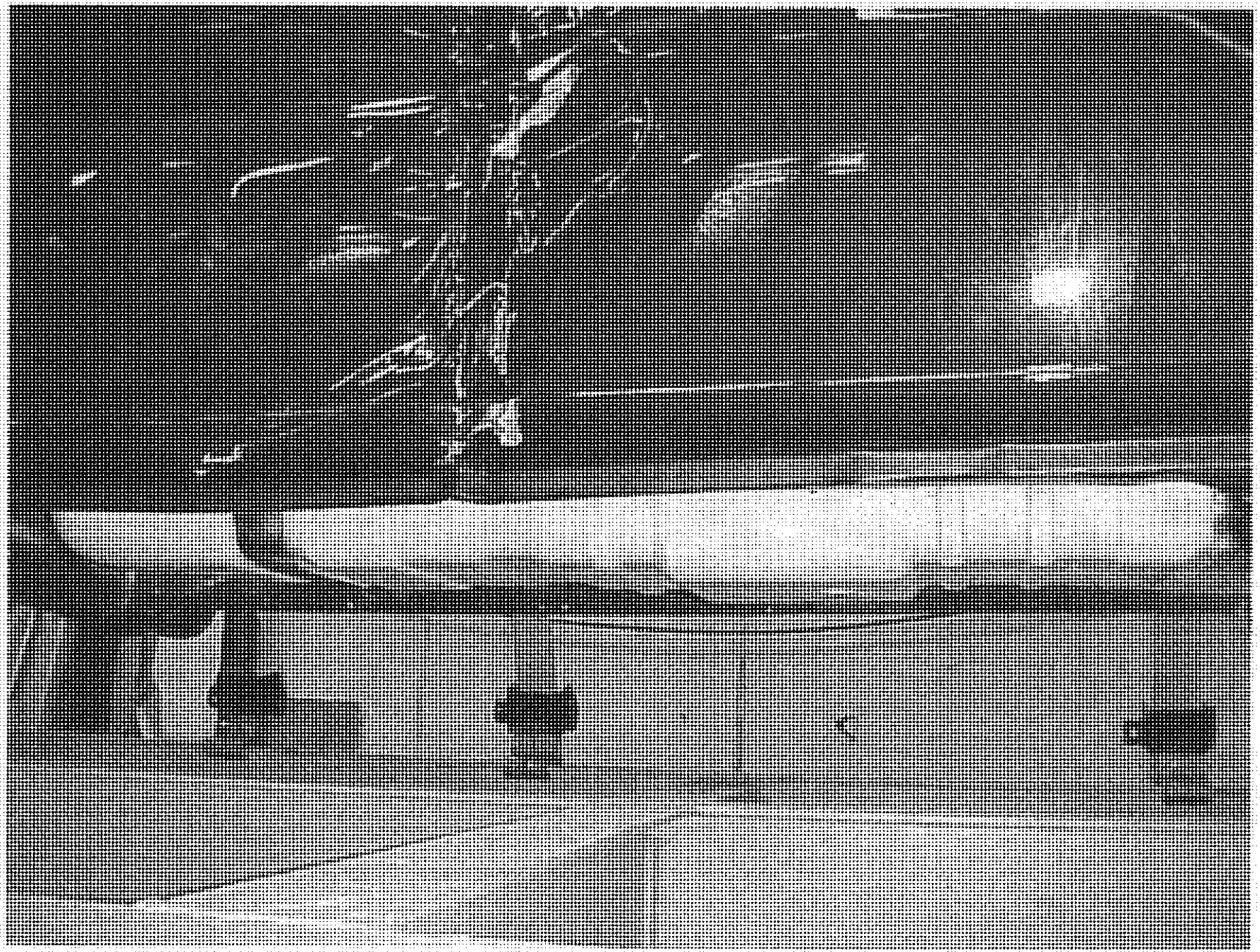
NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.29
UNDERBODY VIEW OF FUEL TANK RIGHT VIEW
POST TEST



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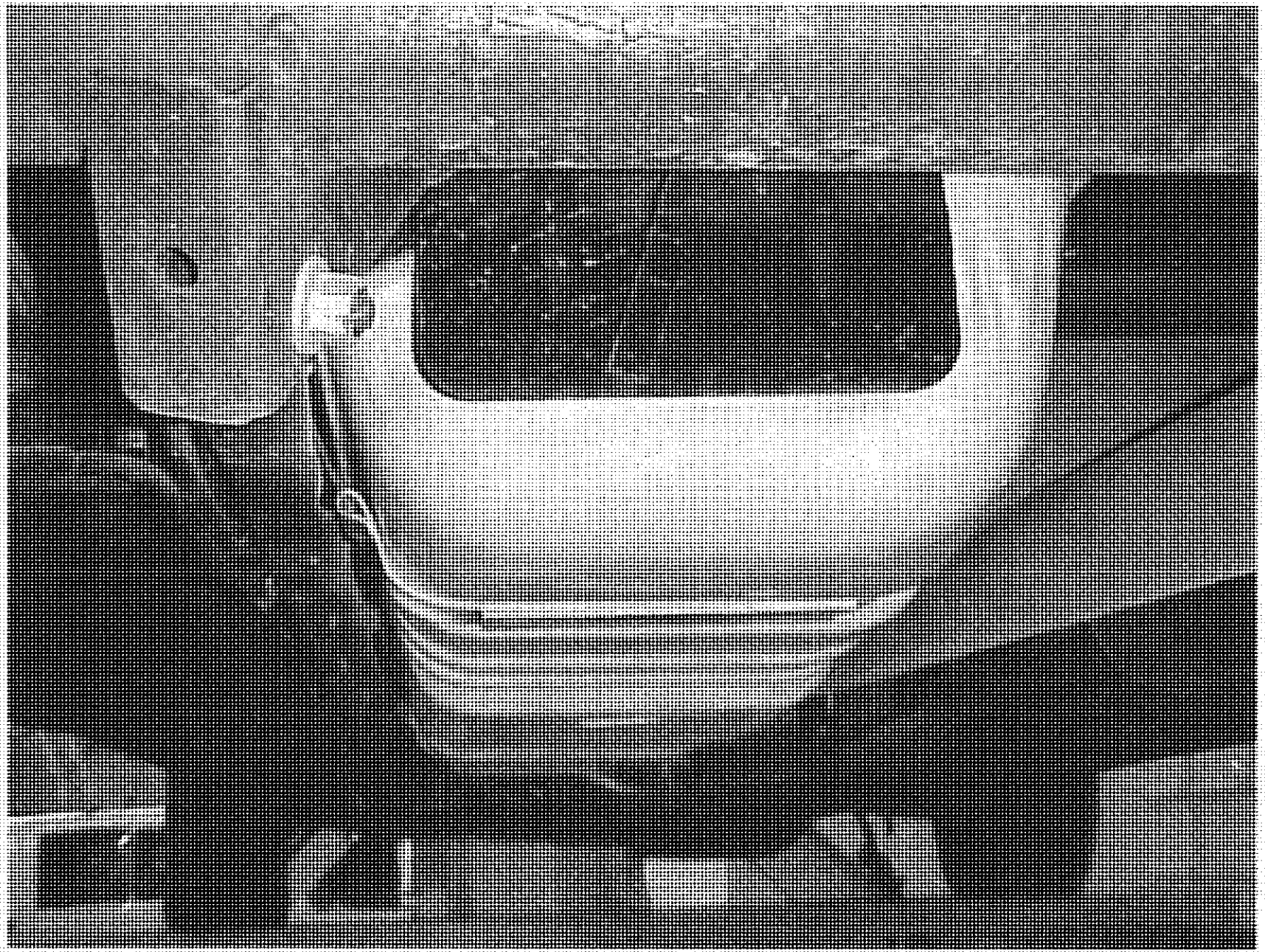
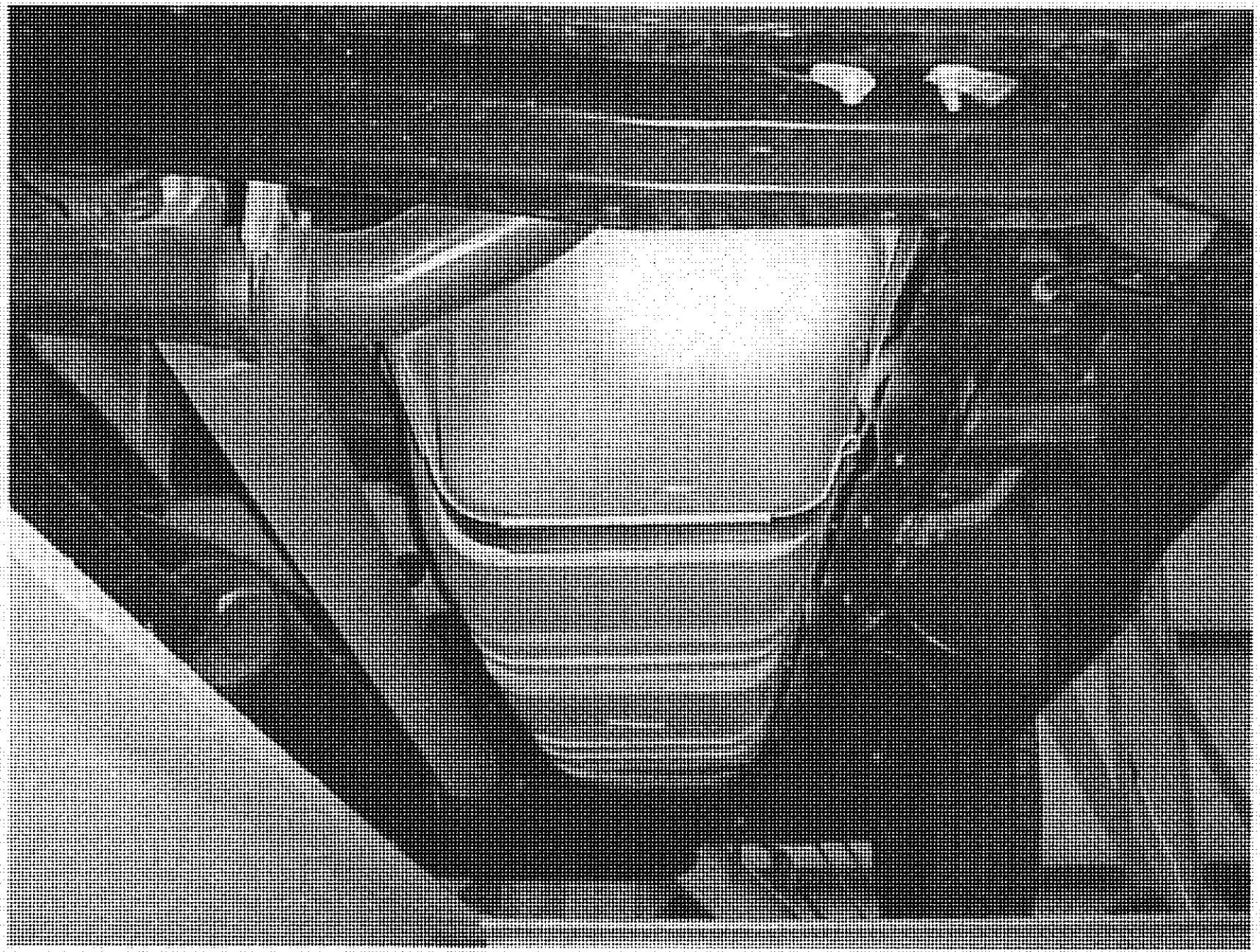
NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.30
UNDERBODY VIEW OF FUEL TANK LEFT VIEW
POST TEST



2004 FORD ECONOLINE
NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.31
UNDERBODY VIEW OF FUEL TANK REAR VIEW
POST TEST



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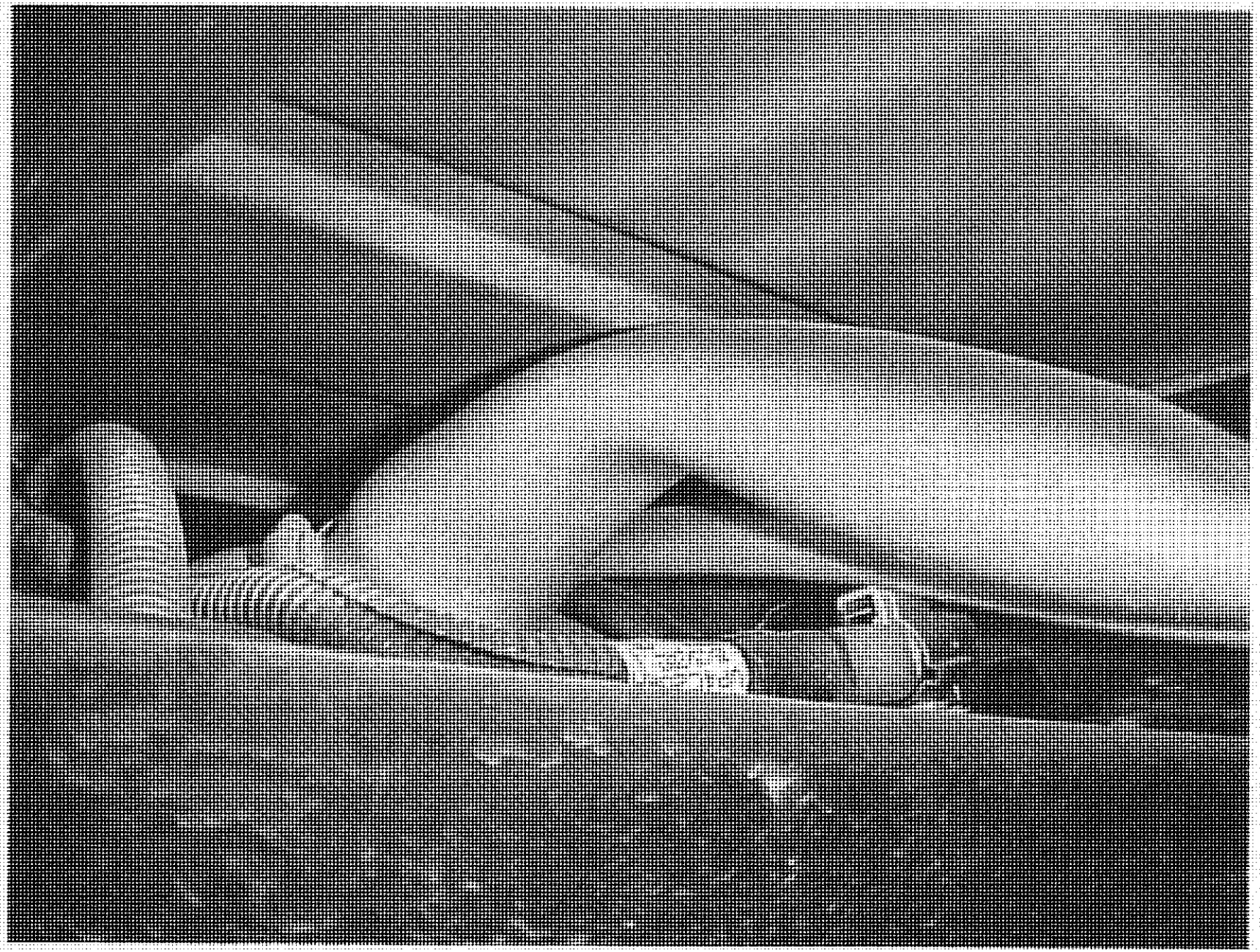
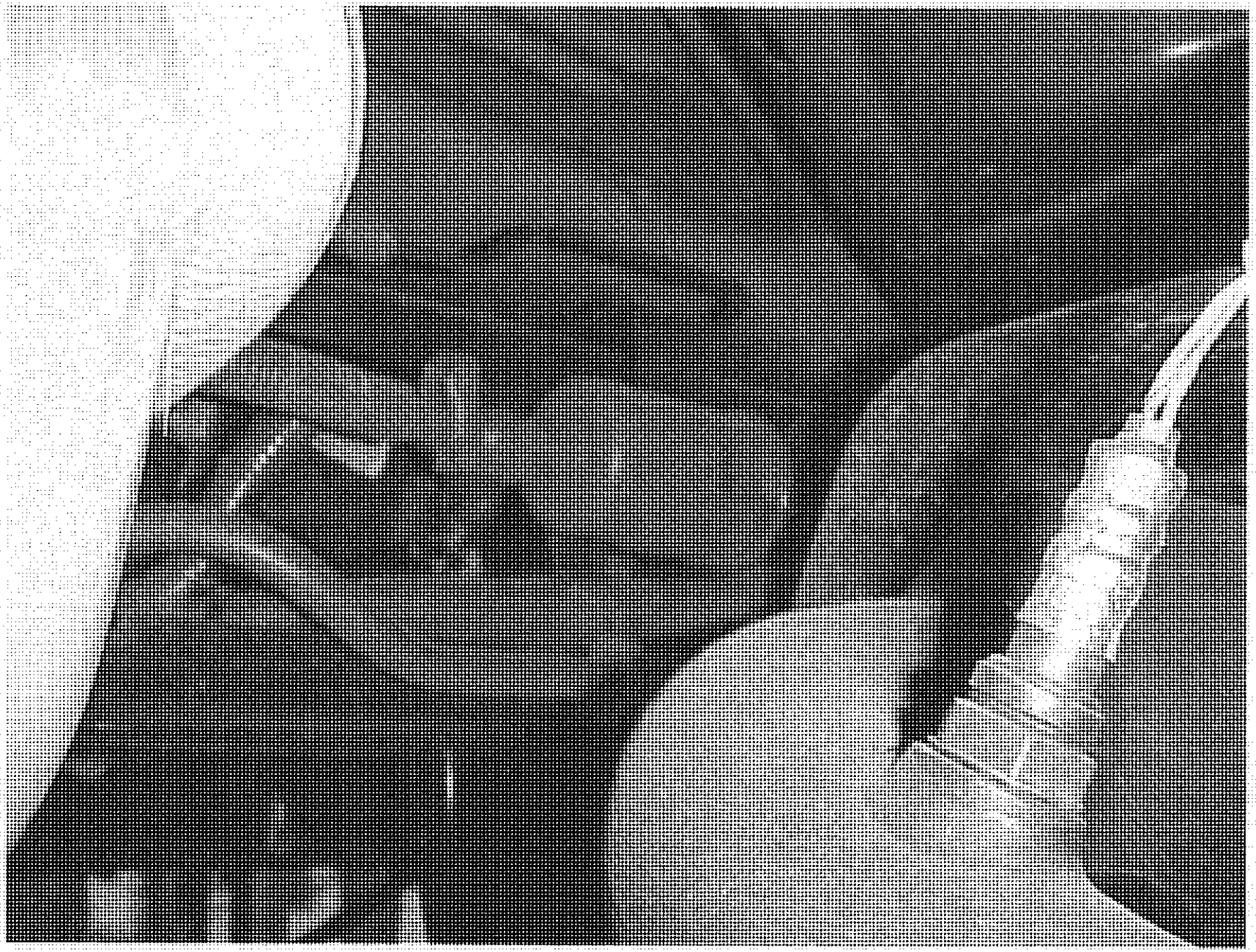
NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.32
UNDERBODY VIEW OF FUEL TANK FRONT VIEW
POST TEST



2004 FORD ECONOLINE
NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.33
UNDERBODY VIEW OF FUEL FILL HOSE AT TANK POST TEST



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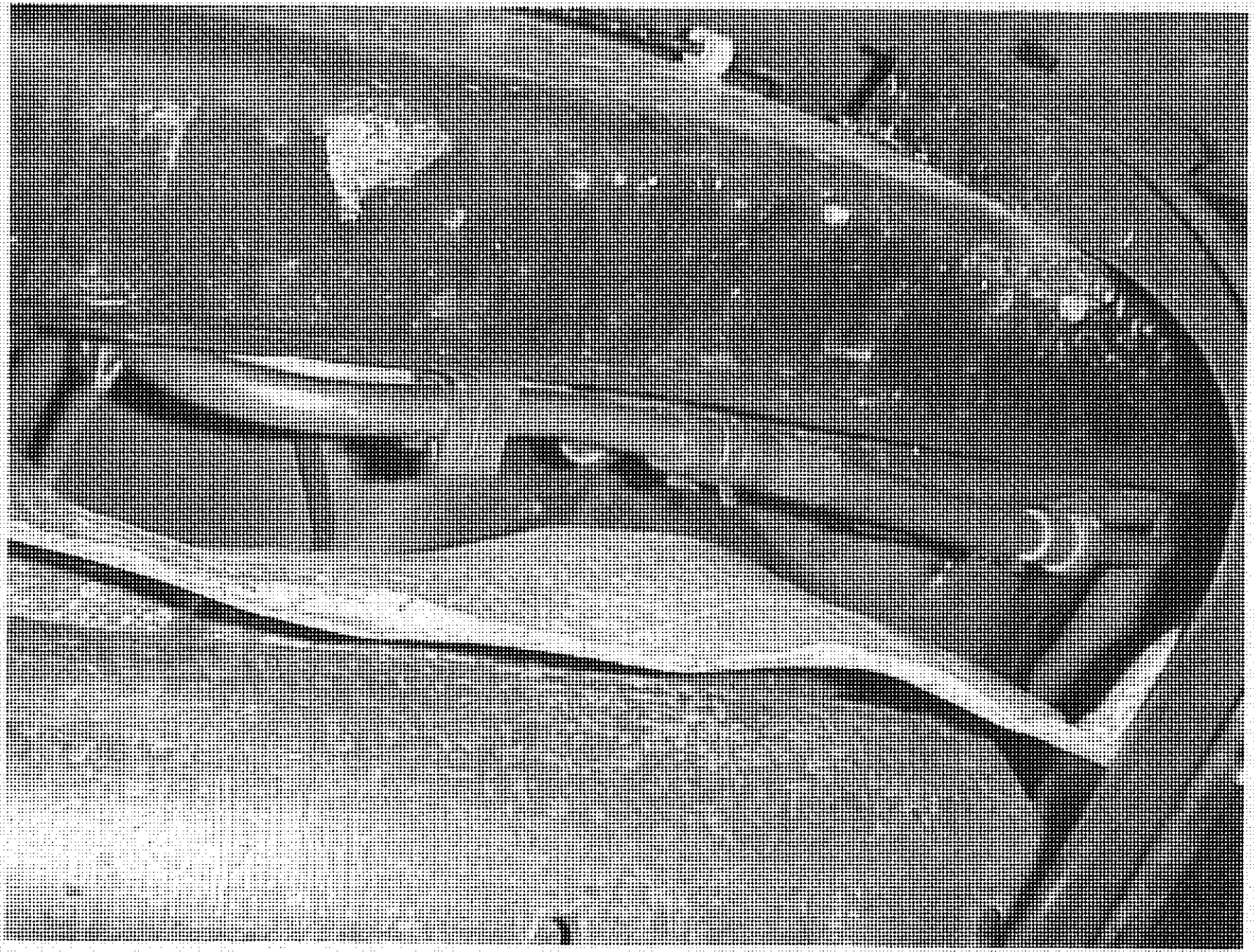
NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.34
UNDERBODY VIEW OF FUEL FILTER AND LINES
AT TANK POST TEST



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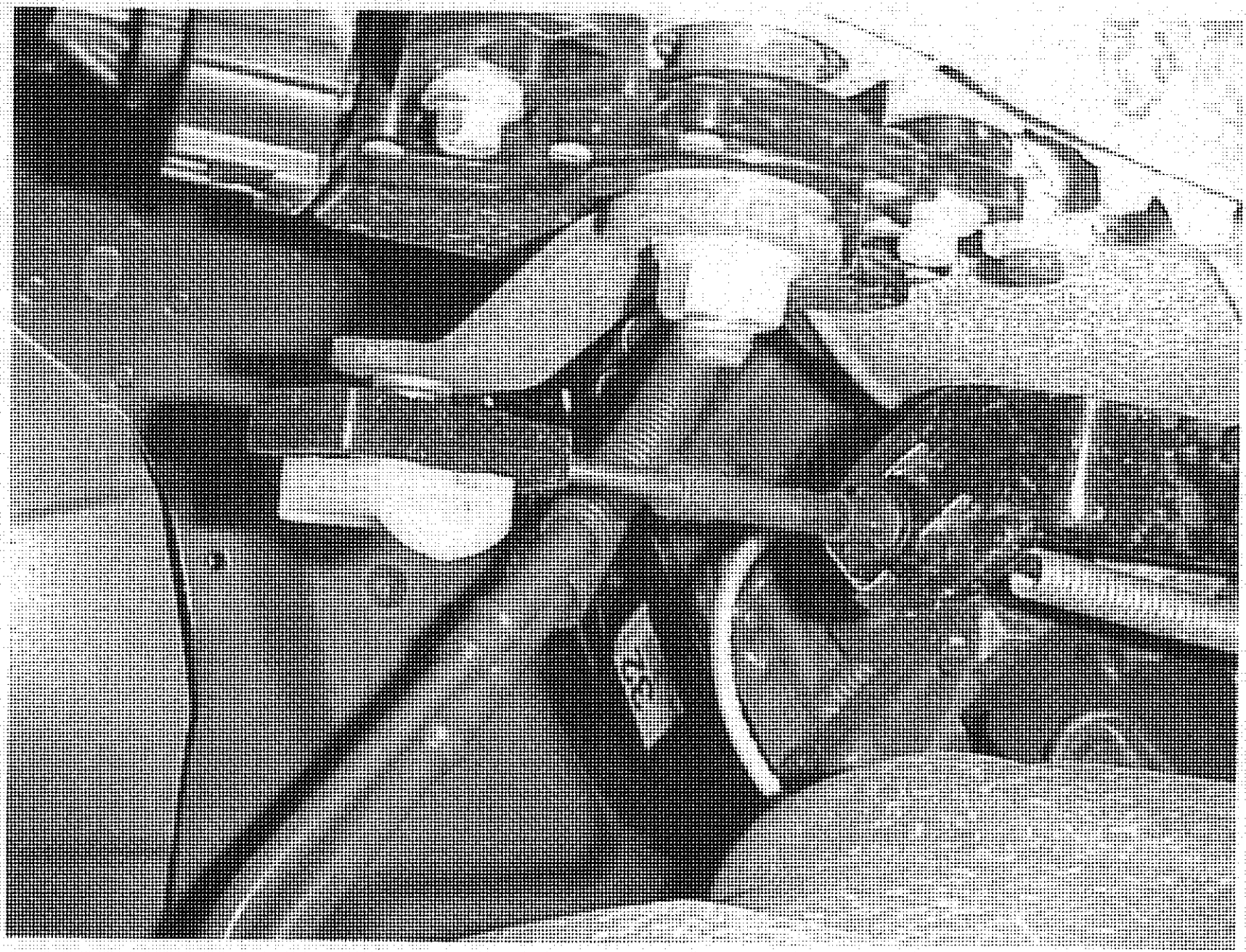
NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.35
UNDERBODY VIEW OF FUEL LINES IN CENTER
POST TEST



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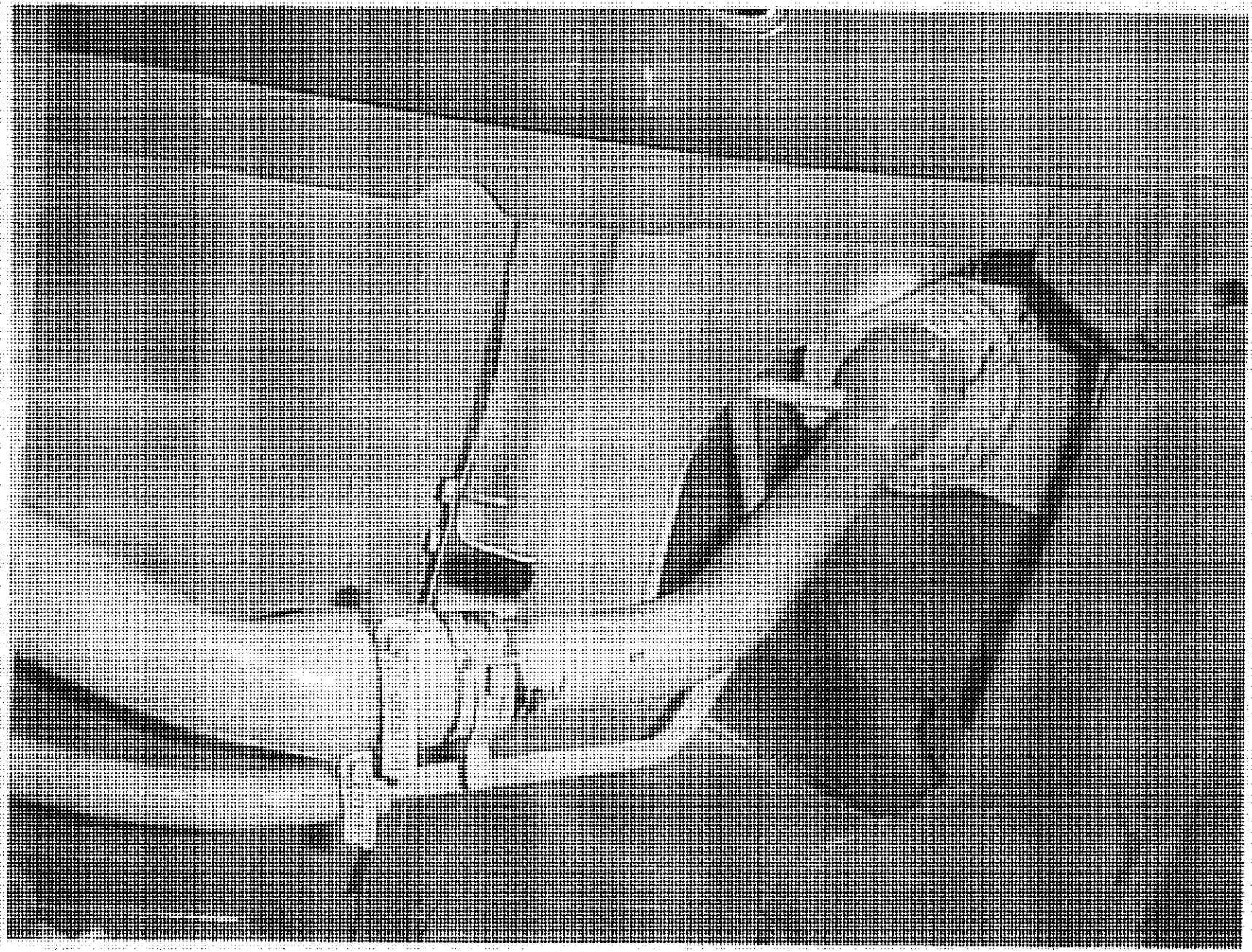
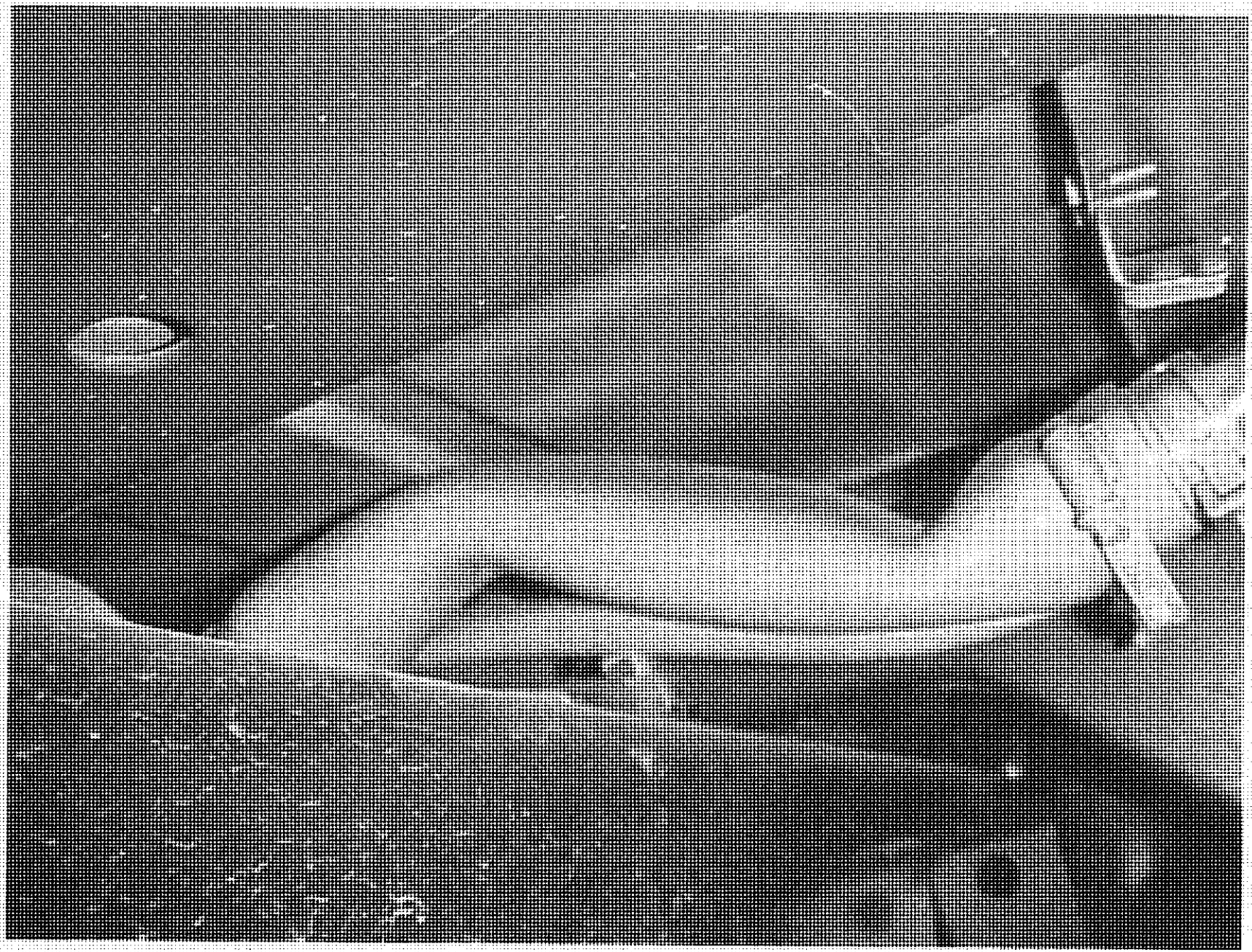
NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.36
UNDERBODY VIEW OF FUEL LINES TO ENGINE
POST TEST



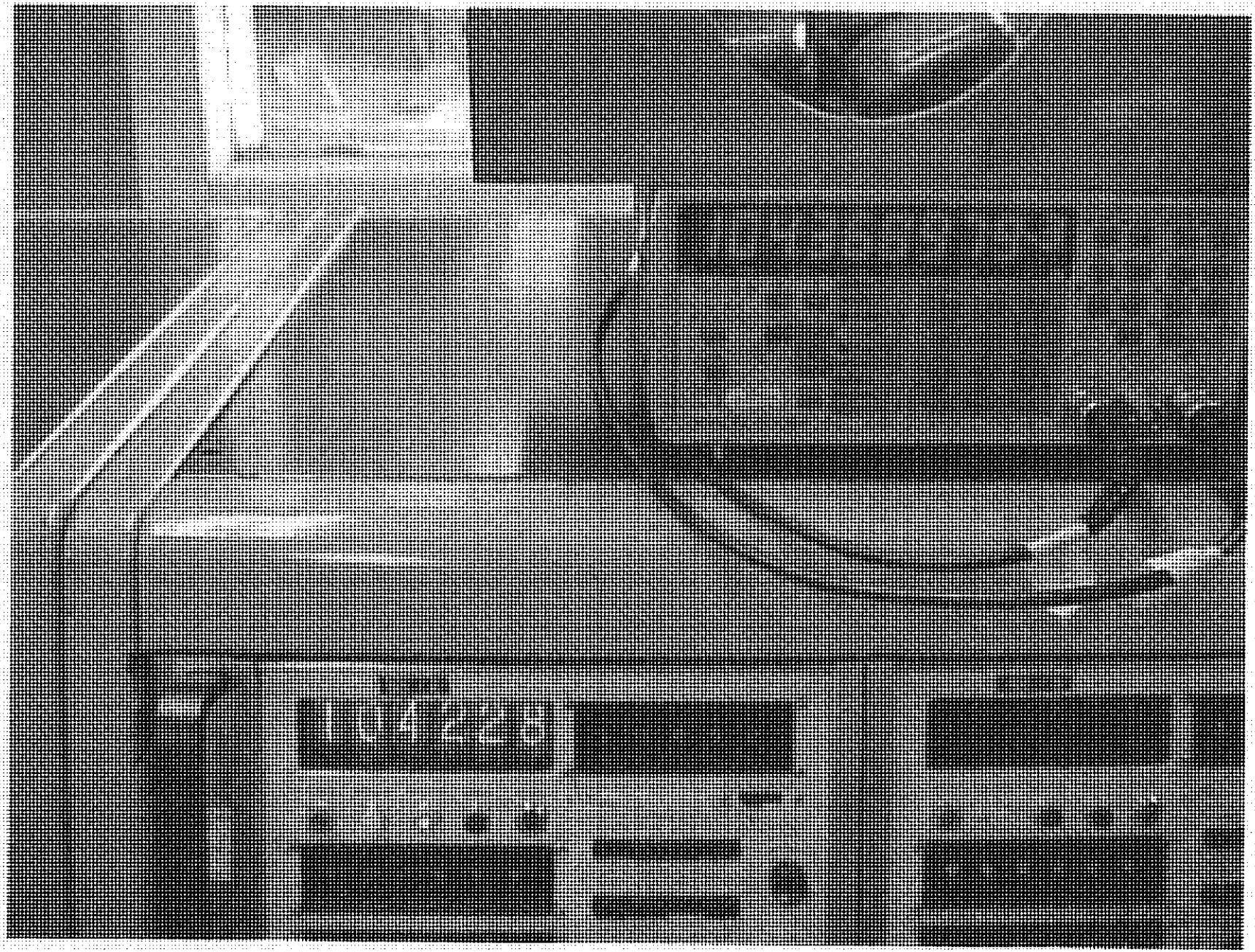
2004 FORD ECONOLINE
NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.37
UNDERBODY VIEW OF FUEL FILL AND VENT LINES POST TEST



2004 FORD ECONOLINE
NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.38
UNDERBODY VIEW OF FUEL FILL AND VENT LINES POST TEST



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NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.39
SPEED COUNTERS POST TEST

2004 FORD ECONOLINE
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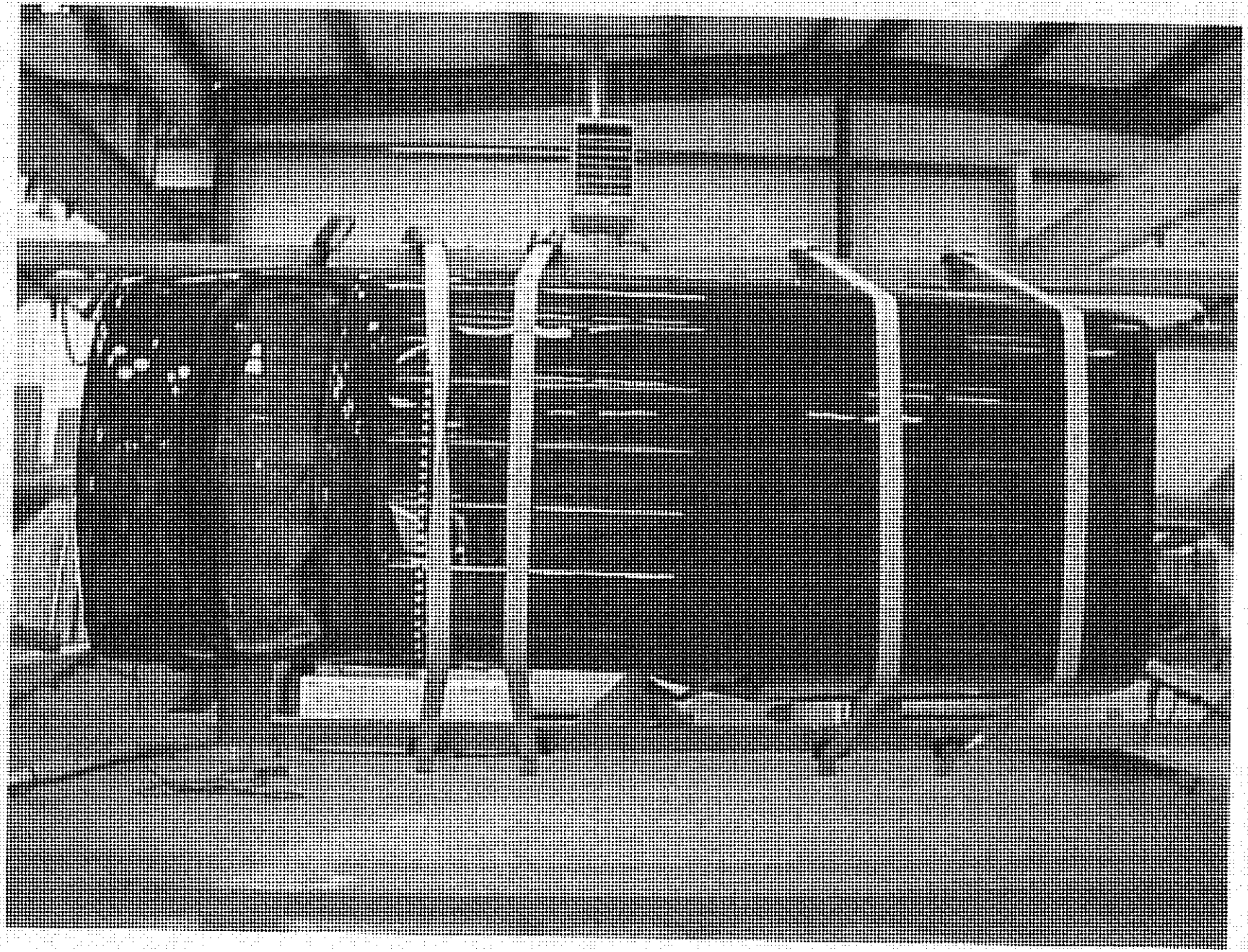
FIGURE 5.40
VEHICLE IN ROLLOVER RIG AT 0°



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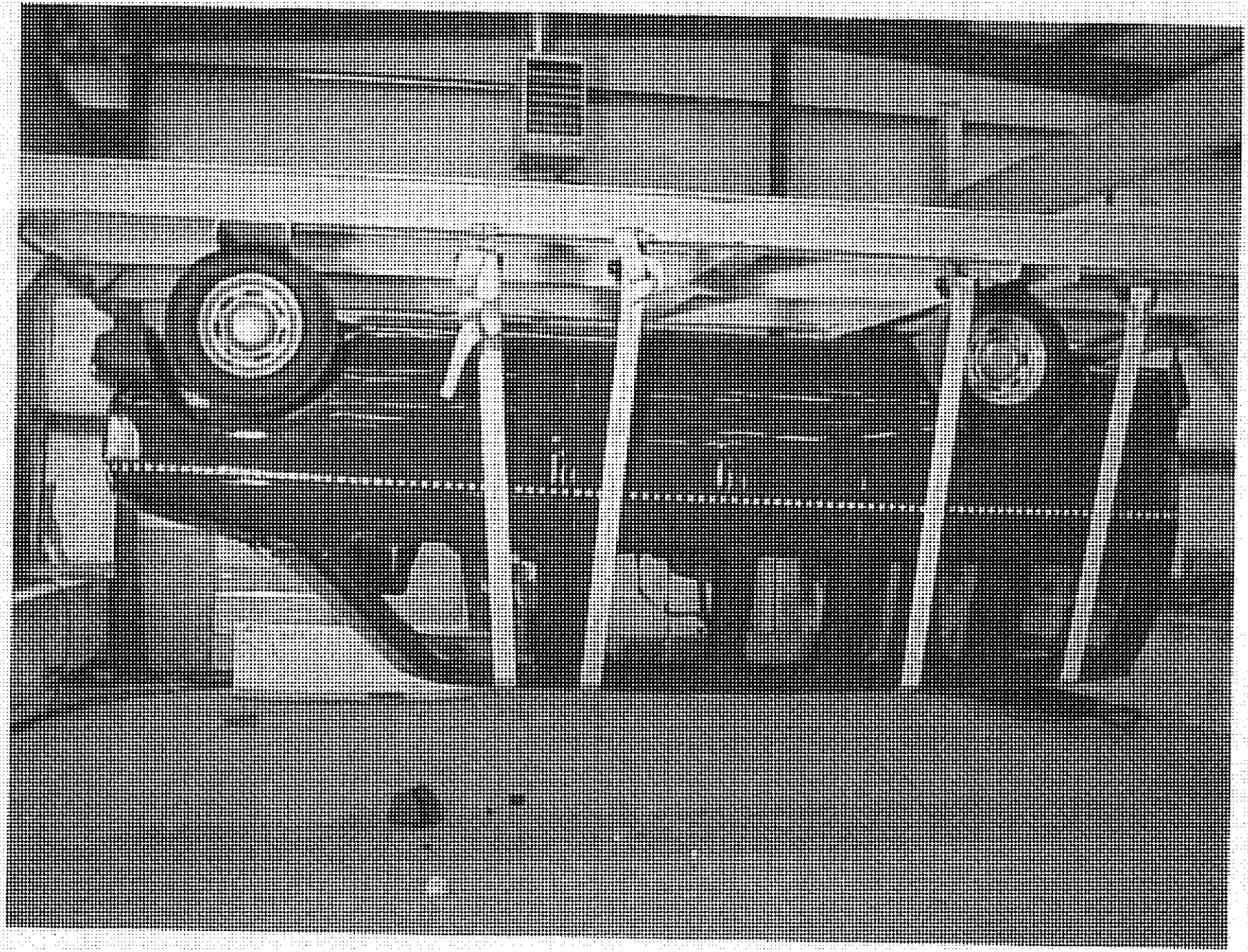
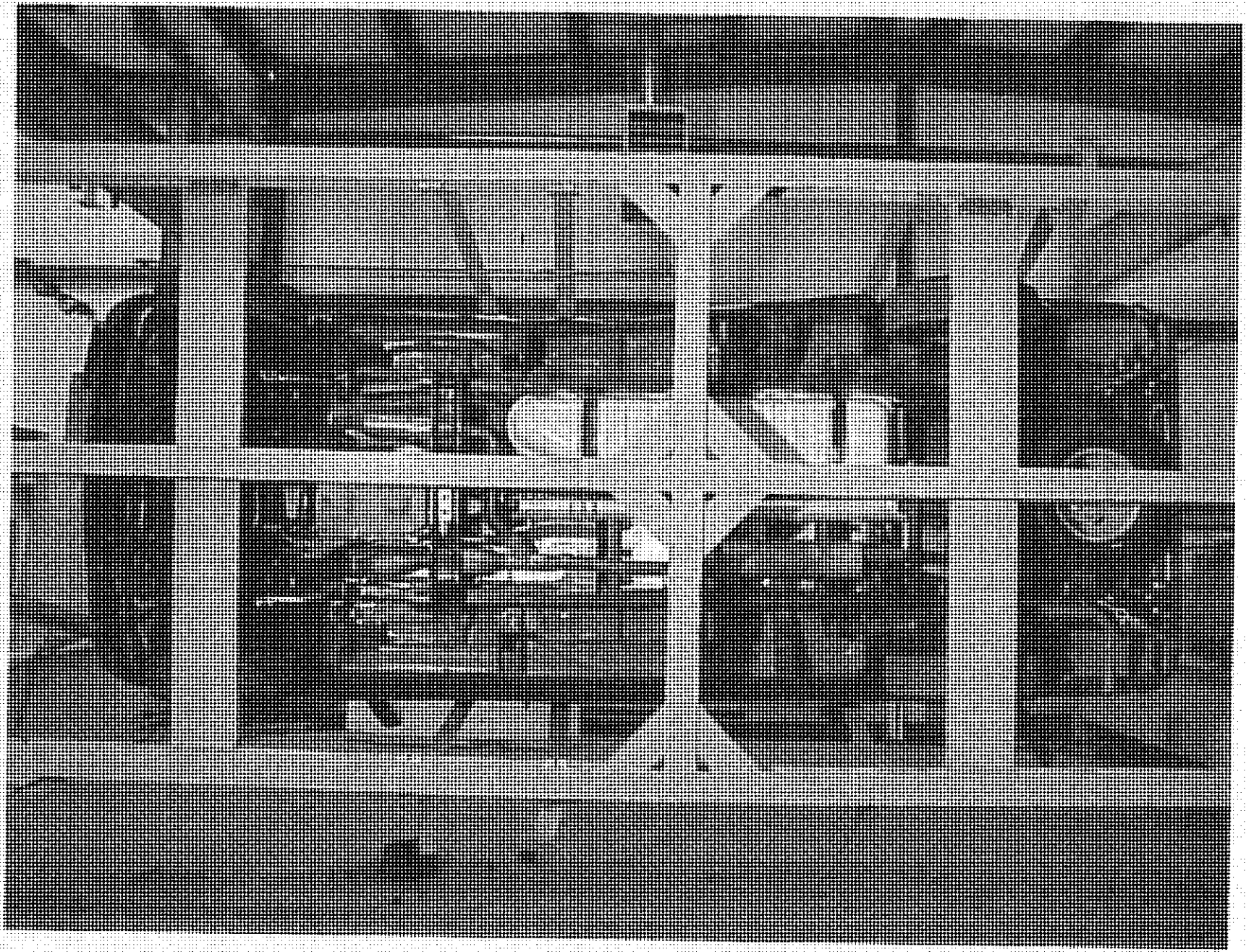
NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.41
VEHICLE IN ROLLOVER RIG AT 90°



2004 FORD ECONOLINE
NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.42
VEHICLE IN ROLLOVER RIG AT 180°

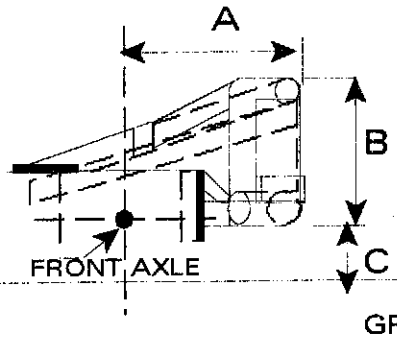


2004 FORD ECONOLINE
NHTSA NO. C40208
FMVSS NO. 301L

FIGURE 5.43
VEHICLE IN ROLLOVER FIXTURE AT 270°

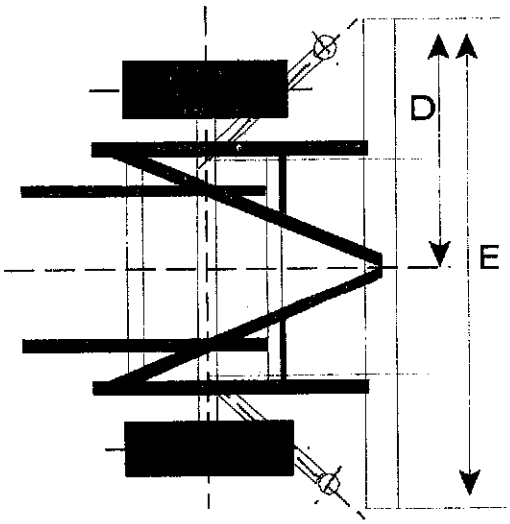
SECTION 6

BARRIER INFORMATION



GROUND SURFACE

SIDE VIEW



TOP VIEW

DIMENSIONS SHOWN IN TABLE ON NEXT PAGE

NOTES:
1.Face Plate 0.50 in. (19mm) thick cold rolled steell
2.All Inner Reinforcements 4.0 x 2.0 x 0.19 in. (102 x 51 x 5mm) Steel Tubing
3.Impact Surface above shown without .75 x 48 x 96 in. Plywood Face attached

LETTER	INCHES	MILLIMETERS
A	20.5*	521*
B	60.0	1524
C	5.0	127
D	39.0	991
E	78.0	198

TEST SET-UP OF COMMON CARRIAGE WITH 60" x 78" FLAT FACE IMPACT SURFACE INSTALLED:

LEFT FRONT WEIGHT	1075
RIGHT FRONT WEIGHT	1075
LEFT REAR WEIGHT	887
RIGHT REAR WEIGHT	887
TOTAL WEIGHT	3924

* EXCLUDING 3/4" PLYWOOD FACE

DIMENSIONS FOR GTL 60" x 78" FLAT FACE IMPACT SURFACE